# Chapter III: Affected Environment

A. How to Read This Chapter ....3-3
B. Resources ....3-3
1. Air Quality ....3-3
2. Geology ....3-6
a) Physiographic Regions ....3-6
3. Soil Resources ....3-8
4. Water Resources ....3-15
a) Arctic Streams ....3-16
b) Coastal Streams ....3-16
c) Interior Streams ....3-17
d) Lakes and Ponds ....3-17
5. Vegetation ....3-27
a) Preliminary Vegetation Classification ....3-27
b) Upland and Riparian Vegetation ....3-30
c) Rare Plants Not Classified as BLM-Alaska Special Status Species ....3-32
d) Noxious and Invasive Plant Management ....3-38
6. Fish and Wildlife ....3-47
a) Fish ....3-47
b) Wildlife ....3-54
7. Special Status Species ....3-71
a) Special Status Plants ....3-71
b) Special Status Fish ....3-83
c) Special Status Wildlife ....3-85
8. Fire Management and Ecology ....3-99
a) Fire History ....3-99
b) Fire Occurrence ....3-99
c) Fire Regimes ....3-99
d) Fuel Condition ....3-102
e) Fire Behavior ....3-102
f) Fire Policy ....3-104
g) Fuels Management ....3-109
h) Smoke Management ....3-109
i) Fire Prevention ....3-109
9. Cultural Resources ....3-117
a) Prehistory ....3-117
b) History ....3-120
c) Historical Themes in the Planning Area ....3-124
d) Known Sites ....3-124
10. Paleontological Resources ....3-127
11. Visual Resources ....3-128
a) Visual Resource Inventory Classes ....3-128
b) Visual Resource Management Classes ....3-129
c) Condition and Trend ....3-129
12. Wilderness Characteristics ....3-133
a) Characteristics by Unit ....3-133
b) Legislative History Relevant to BLM Wilderness ....3-135

C. Resource Uses ..... 3-137
1. Forest Products ..... 3-137
2. Livestock Grazing ..... 3-143
3. Minerals ..... 3-146
a) Leasable Minerals ..... 3-146
b) Locatable Minerals ..... 3-161
c) Mineral Materials ..... 3-203
4. Recreation Management ..... 3-209
a) General Recreation ..... 3-209
b) Special Recreation Permits, Commercial Uses, and Fee Use Areas ..... 3-210
c) Recreation Opportunity Spectrum ..... 3-213
5. Travel Management/OHV ..... 3-217
a) Travel Management ..... 3-217
b) Off-highway Vehicle Management ..... 3-217
6. Renewable Energy ..... 3-223
a) Photovoltaics (PV) ..... 3-223
b) Wind Resources ..... 3-223
c) Biomass ..... 3-224
7. Lands and Realty Actions ..... 3-224
a) Land Use Authorizations ..... 3-224
b) Disposal Actions ..... 3-226
c) Acquisitions ..... 3-227
d) Access Corridors ..... 3-227
D. Special Designations ..... 3-233
1. Areas of Critical Environmental Concern and Research Natural Areas ..... 3-233
a) ACECs ..... 3-233
b) RNAs ..... 3-236
2. Iditarod National Historic Trail ..... 3-238
3. Wild and Scenic Rivers ..... 3-241
a) Laws, Regulations, and Policies ..... 3-241
b) Background ..... 3-242
c) Previous Study of the Squirrel River ..... 3-244
E. Social and Economic ..... 3-249
1. Public Safety ..... 3-249
a) Abandoned Mine Lands ..... 3-249
b) Hazardous Materials Management ..... 3-250
2. Social and Economic Conditions ..... 3-259
a) Social and Economic ..... 3-259
b) Environmental Justice ..... 3-268
c) Socio-cultural Systems ..... 3-270
F. Subsistence ..... 3-276
1. Traditional Subsistence Use Patterns in the Planning Area ..... 3-276
2. Subsistence Patterns Today ..... 3-279
3. Federal Subsistence Management ..... 3-281
4. Economics of Subsistence ..... 3-282

# Chapter III: Affected Environment

## A. How to Read This Chapter

This chapter provides background information on the various resources, resource uses, and programs within the Kobuk-Seward Peninsula Planning Area, and describes their condition and trend. The chapter is organized into four sections: Resources, Resource Uses, Special Designations, and Social and Economic Conditions. Each of these four sections is split further into resources or program areas. Each section includes a discussion of the presence, condition, and trend of the topic area.

## B. Resources

### *1. Air Quality*

Air quality throughout the planning area is pristine or nearly so, except for periods in the summer when forest fires may increase the airborne particulates or high winds may blow exposed sand and gravel from large river bars or dust associated with reindeer herding activities. Smoke from naturally-occurring forest fires may exceed U.S. Environmental Protection Agency (EPA) limits for airborne particulates; however, little can be done to affect these impacts as smoke can originate from as far away as Canada or Siberia. The Alaska Department of Environmental Conservation (ADEC) has statutory authority for air quality in Alaska. Written authority is required from ADEC for any controlled burn of 40 or more acres (see the Fire Management and Ecology section beginning on page 3-99 for more information on fire management).

Rural villages often use diesel power generation stations and oil or wood for heating houses, uses that may cause local increases in particulates during periods of still air. Air quality within the planning area meets the National Ambient Air Quality Standards and Alaska air quality laws and regulations. Concentrations of regulated air pollutants are far less than the maximum allowed levels. The EPA classifies the areas that comprise the planning area as attainment areas because they meet the standards of the Clean Air Act.

The air resources of the planning area are constantly changing as winds and climatic systems move air masses across Alaska. Three internal or geographic factors that determine climate in Alaska are latitude, continentality, and elevation. To understand how these factors affect air quality, a brief discussion, taken largely from the Alaska Climate Research Center (2004), follows.

The amount of solar radiation varies with latitude: the higher the latitude, the greater the range of seasonal variability. Areas at or north of the Arctic Circle (66°33') experience long summer days when the sun does not set, but remain in darkness for much of the winter. These conditions create periods of relatively warm temperatures during the constant summer sunlight,

followed by a long, very cold winter. In contrast, spring and fall are often very short periods of rapidly changing weather. These areas are said to have an Arctic climate.

Continentality refers to the influence of the ocean waters and sea ice on climate. Those areas closest to the coast (e.g., much of the Seward Peninsula) are considered to have a maritime climate since proximity to the ocean limits diurnal and seasonal temperature variability, creates high humidity, and results in relatively high precipitation and wind. In contrast, areas of continental climate further inland (e.g., the upper Kobuk Valley) are not affected by the moderating influence of the ocean waters. They exhibit much larger daily and annual temperature variations, lower humidity, and relatively low precipitation and wind. Sea ice can alter this pattern by limiting the moderating effects of open water during the winter, creating more extreme continental conditions once the ocean has frozen over. These areas may be referred to as transitional, with a maritime climate in the summer and early fall, and a continental or Arctic climate in winter and early spring.

The normal effect of elevation is a decrease in ambient temperature with increasing elevation. While this is true in the summer, areas of low elevation, such as large river valleys, often exhibit extremely low temperatures during the winter. The low temperature inversion occurs during cold, clear, calm weather when radiative cooling in the atmosphere traps pockets of cold air near the ground. Hills that are only a few hundred feet high may be 20-30° F warmer than the valley bottom. This can occur in the planning area wherever topography and wind (or lack thereof) are favorable to forming inversions. While seldom a problem in the coastal, urban areas of Nome or Kotzebue, these inversions in the Interior can be long lasting (up to several weeks) and can trap smoke and other pollutants, often resulting in exceedances in air quality standards in major urbanized basins such as Fairbanks.

While these internal factors generally produce more or less predictable long-term weather patterns, there are a number of other factors that result in significant climatic variability, including the position of the polar jet stream, winds over the north polar region, and water temperatures in the Pacific Ocean. The following discussion is taken largely from Papineau's *Understanding Alaska's Climate Variation* (2004).

The polar jet is a mass of strong upper-level winds that circulate from west to east across the North Pacific. The position of these winds, often simply called the jet stream, is important because air temperatures are often 10-20° F cooler to the north of the polar jet than air to the south. While the path of the polar jet often follows a seasonal pattern (north of the Alaska Peninsula in summer and south towards the Gulf of Alaska in winter), the jet can shift large distances in a few days, altering storm tracks and producing major weather changes. At other times, the jet may remain stationary for several weeks or more, blocking weather changes. During the winter, this can produce extremely cold, calm weather in Interior Alaska. In 2004, this weather pattern resulted in a warm dry summer and major forest fires, with resulting smoke blanketing central Alaska from the Canadian border to the Seward Peninsula.

The winds over the North Polar Region at an elevation of 20-30 miles blow in a counter-clockwise direction. Variation in the strength and position of these winds is termed the Arctic Oscillation. These variations can alter storm track winds in the lower atmosphere, changing the position and strength of local or regional weather patterns. The greatest effects have been noted in the western Arctic.

Probably the most publicized external factors in climate variation are long-term fluctuations in water temperature in the Pacific Ocean. The Pacific Decadal Oscillation (PDO) is a roughly 20-

year fluctuation in sea-surface temperatures in the North Pacific Ocean. A similar variation in the central and equatorial oceans is termed El Niño/La Niña. A period of warmer than normal water temperature is a positive PDO or El Niño, while a period of cooler than normal water temperature is a negative PDO or La Niña. While a positive PDO or El Niño is generally characterized by warmer than normal temperatures and higher precipitation in Alaska, the specific effects of El Niño depends on the phase of the PDO. Generally, a negative PDO or La Niña produces cooler and drier than normal conditions. Rarely, a La Niña will occur during a positive PDO, where the effects can be highly variable in different regions of the state.

Another factor that affects air quality is airborne particulates from outside Alaska. During the winter and spring, winds transport pollutants from industrial Europe and Asia across the Arctic Ocean to Arctic Alaska (Rahn et al. 1982). These pollutants cause a phenomenon known as Arctic haze. The haze is mostly comprised of sulfates mixed with carbon, and of other by-products from coal burning and metal smelting (ADEC 2002). Despite this seasonal long-distance transport of pollutants into the Arctic, the planning area is still considered an attainment area because it meets the standards of the Clean Air Act.

A final factor in climate variation is climate warming. The mean annual temperature in Alaska has increased 2.5° F for the period of 1971 to 2000 (Alaska Climate Research Center 2004). It is uncertain whether this increase is a result of phase shift in one or more of the external weather factors, such as the PDO and El Niño/La Niña cycles, or whether it is due to an increase in greenhouse gases, combustion products of fossil fuels that trap a greater amount of solar radiation (Papineau 2004).

In summary, the air quality in the planning area is pristine or nearly so, largely due to the lack of large cities or industrial development. While certain internal geographic factors determine the three climatic regions within the planning area, various external weather factors can significantly alter these expected patterns. The observed increase in temperatures during the last 30 years may be a result of phase shift in one or more of the external weather factors or to an increase in greenhouse gases that trap a greater amount of solar radiation.

# 2. Geology

## a) Physiographic Regions

The planning area includes terrain ranging from coastal lowlands to mountainous regions with greater than 3,000 feet of local relief (Wahrhaftig 1965). Continuous permafrost underlies the majority of the planning area to an estimated depth of 1,000 feet (Map 3-2). Thermokarst topography and other cryogenic processes present within the planning area include tussock tundra, thermokarst lakes, pingos, and patterned (polygonal) ground. An active layer exhibiting seasonal thaw up to 4 feet thick is present at the surface. Wahrhaftig's description of Alaska's physiographic provinces remains the authoritative reference, portions of which are selected below.

### *(1) Arctic Coastal Plain*

The Arctic Coastal Plain Province extends south from the Arctic Ocean, rising gradually to a maximum elevation of 600 feet. The smooth plain is underlain by permafrost and permafrost landforms are ubiquitous. The area is poorly drained, with numerous lakes and marshy areas. A scarp 50-200 feet tall locally separates the Arctic Coastal Plain Province from the Arctic Foothills Province to the south. The Arctic Coastal Plain is underlain by Quaternary to Tertiary sedimentary units.

### *(2) Arctic Foothills*

The Arctic Foothills Province occupies the area between the Arctic Coastal Plain Province and the area north and west of the Western Brooks Range (as part of the Arctic Mountains Province). Rolling plateaus and low linear mountains rise from 600 feet in the north to over 3,000 feet in the south. Upland tundra plateaus are typically dissected by north-flowing braided streams. Although not covered by glaciers, the area is entirely underlain by permafrost and exhibits frozen ground morphologies. The Arctic Foothills Province bedrock consists of Quaternary to Devonian sedimentary units and mafic intrusives, with structural over-thrusting to the north.

### *(3) Arctic Mountains (Western Brooks Range)*

The Baird and De Long mountains and the intervening lowland occupied by the Noatak River comprise the Arctic Mountains Province in the planning area. Sharp, glaciated peaks in mountainous areas rise abruptly to 2,500-4,500 feet in altitude and are cored by Paleozoic metasediments (Baird Mountains) and Devonian to Cretaceous sediments (De Long Mountains). Massive diabase dikes intrude the De Long Mountains and are prominent cliff-forming features. Structural trends are predominantly east-west to northeast-southwest. The Noatak River Valley and adjacent rolling uplands host numerous morainal and thaw lakes. Primary drainage for the province is via the south-flowing Noatak River; the south slopes of the Baird Mountains drain into the Kobuk River.

A small area near Ambler and Kobuk in the eastern portion of the planning area is covered by intensely glaciated ridges along the abrupt southern front of the Brooks Range. Ridges in the

Ambler area are composed of Mesozoic metamorphosed basalts (greenstone), while intervening valleys are underlain by folded Cretaceous sediments.

### *(4) Bering Shelf*

The Bering Shelf Province occupies a limited (less than 250,000 acres) portion of the planning area adjacent to the coastal village of Shaktoolik on Norton Sound. The Bering Shelf Province is extensively covered by quaternary sand and silt. Local bedrock exposures range from Cretaceous and Tertiary volcanic units (chiefly basalts) to older Paleozoic crystalline rocks. The Bering Shelf Province, along with the Seward Peninsula and Western Alaska provinces, was part of the ice-free Beringia Corridor that connected Alaska to northeast Asia during the last glaciation.

### *(5) Seward Peninsula*

The entire Seward Peninsula Province is contained in the Seward Peninsula area, and as such represents the largest portion of the planning area. The Seward Peninsula Province is approximately 200 miles wide in an east-west direction, 140 miles long in a north-south direction, and is bordered on the west by the Bering Strait Province and to the east by the Western Alaska Province. The Seward Peninsula Province consists of an extensive upland area with interior basins and coastal lowlands. The uplands portion ranges from mainly broad-sloping hills up to 2,000 feet in altitude; isolated groups of glaciated peaks below 4,700 feet in elevation are concentrated in the south. Interior basins are drained through narrow canyons which cut the uplands, transitioning into meandering streams which cross the lowlands to the ocean. Paleozoic bedrock is predominant on the Seward Peninsula, consisting of metasediments and metamorphosed volcanic rocks, all cut by later granitic intrusives. Quaternary lava flows occupy the north-central portion of the province.

### *(6) Western Alaska*

The Western Alaska Province covers the southeast-quarter of the planning area. The province is dominated by the Kobuk-Selawik Lowlands and Nulato Hills, and numerous smaller lowland and hill areas. Most of the area drains into Kotzebue Sound via the Kobuk and Selawik rivers, although streams draining the western slopes of the Nulato Hills discharge to Norton Sound. Thaw lakes are common in lowland areas. Local relief in the Nulato Hills area is 500-1,500 feet, with peaks that reach to 2,500 feet in elevation. Most of these low, rolling hills have been spared from recent glaciations and were part of the ice-free Beringia Corridor linking North America and Asia. The Nulato Hills are cored by tightly folded Cretaceous sediments and minor volcanics. The Selawik Hills, which rise abruptly from the Kobuk-Selawik Lowlands to as much as 3,300 feet in elevation, have gently sloping to flat summits. Geology in the Selawik Hills is typified by Paleozoic and Mesozoic metavolcanic and granitic rocks.

# 3. Soil Resources

The soil information for the planning area and Map 3-1 was largely derived from the U.S. Department of Agriculture (USDA) Soil Conservation Service's *Exploratory Soil Survey of Alaska* (Rieger et al. 1979). That exploratory soil survey resulted from the need for general soil information to be used for land use planning. Exploratory survey and field mapping was initiated in 1967 and completed in 1973. Field mapping was done at a scale of 1:500,000, while most topographic maps are available at a scale of 1:250,000 or better. Largely derived from existing soil maps and reports, supplemental field observations were made from the air to identify and map distinctive landscape patterns. Soils within each landscape segment were described and classified; relationships between the soils, the native vegetation, and landforms were noted; and the proportion of the area occupied by each major type of soil was estimated. It is important to recognize that this exploratory survey did not provide the level of information required for intensive use of a particular area, as would be available in a more detailed soil survey.

A dominant factor in defining soils is the presence or absence of permafrost. Permafrost is defined as soil, sand, gravel, or bedrock that has remained below 32° F for two or more years (Muller 1945). Almost continuous throughout the planning area, permafrost can exist as massive ice wedges and lenses in poorly drained soils or as a relatively dry matrix in well-drained gravel or bedrock. During the short Arctic summer, these soils thaw, forming a shallow unfrozen zone termed the active layer. Permafrost forms a confining barrier that prevents infiltration of surface water and keeps the active layer of soils saturated. Permafrost also provides the structural integrity to hillsides and stream channel banks. Map 3-2 shows the distribution of permafrost in the planning area.

While permafrost is an integral component of the soils of the planning area, any surface disturbance, including forest fires, that removes the overlying vegetation can initiate melting of ice-rich permafrost and result in surface subsidence (termed thermokarsting), drastically altering the surface topography, hydrological regime, and temperature of the underlying soils. As permafrost begins to thaw near the surface, it warms to greater depths, forming thaw ponds, gullies, and beaded streams. The hydrologic and thermal regime of the soil is the primary factor controlling the vegetation. These changes to the thermal regime of the soil initiate a long process of recovery with perhaps 20-50 years of cumulative impacts (Hinzman et al. 2000).

As noted on page 3-5 in the Air Quality section, the mean annual temperature in Alaska has increased 2.5° F for the period of 1971 to 2000 (Alaska Climate Research Center 2004). Romanovsky et al. (2004) have shown that the permafrost temperatures and active-layer thickness along a transect of sites in Arctic and northwestern Alaska have increased. The largest changes occurred near the coast, as compared to sites further inland. This suggests that either coastal areas are more sensitive to change or that the forces driving the process of warming are greater in coastal areas. Any long-term climate warming may accentuate these processes.

Major Land Resource Areas (MLRAs) are geographically-associated land resource units classified by the dominant physical characteristics: land use, elevation and topography, climate, water, soils, and vegetation. The USDA Natural Resources Conservation Service (NRCS) recently revised the MLRA map of Alaska in 2003 (NRCS 2003). Ten MLRAs have been identified in the planning area: Yukon-Kuskokwim Highlands; Upper Kobuk and Koyukuk Hills and Valleys; Interior Brooks Range Mountains; Nulato Hills-Southern Seward Peninsula Highlands; Seward Peninsula Highlands; Northern Seward Peninsula-Selawik Lowlands;

Western Brooks Range Mountains, Foothills, and Valleys; Northern Brooks Range Mountains; Arctic Foothills; and Arctic Coastal Plain. Each MLRA has a unique pattern of topography, climate, vegetation, and soils. A brief description of each of these areas follows.

The **Yukon-Kuskokwim Highlands MLRA** is present in only a small, eastern portion of the planning area. The area includes hills and low mountains between the central Yukon River and Bristol Bay. The deep, narrow valleys separate the ridges to the north, while more rolling hills interlaced with streams, sloughs, lakes, and marshes occupy the southern area. The fine-grained alluvial sediments, rich in organic materials, and coarse alpine soils are generally shallow over ice-rich permafrost. The well-drained south-facing hill sides and river terraces may be permafrost free.

The **Upper Kobuk and Koyukuk Hills and Valleys MLRA** occupies most of the upper Kobuk Valley and surrounding uplands. This area includes mostly rounded to steep hills and narrow valleys. Soils are derived from silty, colluvial sediment and loess blown from the floodplains of the larger rivers. Permafrost is almost continuous and shallow, and is more pervasive on lowlands and north-facing slopes than on well-drained southern exposures.

The **Interior Brooks Range Mountains MLRA** occupies a small, northeastern portion of the planning area. Most of the soils consist of silty, colluvial, and residual materials weathered from fine-grained sedimentary rocks. A few soils were formed from coarse-gravel glacial drift. While the soils on south-facing slopes and gravelly moraines are often well-drained, ice-rich permafrost underlies saturated soils on valley bottoms, low toe slopes, and north-facing hillsides.

The **Nulato Hills-Southern Seward Peninsula Highlands MLRA** occupies the broad valleys and rolling plateaus of the southern Seward Peninsula, eastern Norton Bay, and Nulato Hills. Large marshy areas, such as McCarthy's Marsh and the Koyuk River basin, are interspersed between rugged mountainous uplands. These upland soils are formed in thick colluvial and glacial deposits, gravelly and stony residual materials, and partially weathered bedrock. Most upland soils are shallow over permafrost with solifluction lobes, polygonal ground, and other frost-scarred features common. The finer-grained valley sediments are rich in organic materials and are generally shallow over ice-rich permafrost.

The **Seward Peninsula Highlands MLRA** occupies most of the central and eastern Seward Peninsula and Selawik Hills. Wide river valleys and floodplains are separated by low, rounded to rugged hills. Lakes, ponds, and marshes are common. The finer-grained valley sediments are rich in organic materials while the upland soils are formed from coarser colluvium and weathered bedrock. Most soils are shallow over permafrost.

The **Northern Seward Peninsula-Selawik Lowlands MLRA** encompasses the Baldwin Peninsula, Kobuk River Delta, Selawik Lowlands, and the northwestern Seward Peninsula. These nearly-level plains are covered with numerous shallow lakes and meandering rivers and the elevation seldom exceeds 100 feet. Most of the soils are fine-grained alluvial sediments over shallow permafrost.

The **Western Brooks Range Mountains, Foothills, and Valleys MLRA** occupies much of the Baird and De Long mountains in the planning area. Most of the soils consist of silty, colluvial, and residual materials weathered from fine-grained sedimentary rocks. A few soils were formed from coarse-gravel glacial drift. While the soils on south-facing slopes and gravelly moraines

are often well-drained, ice-rich permafrost underlies saturated soils on valley bottoms, low toe slopes, and north-facing hillsides.

The **Northern Brooks Range Mountains MLRA** occupies a narrow strip that comprises the highest portion of the Brooks Range in the planning area. Soils are exceedingly thin or absent. Soils are derived from wind blown silt, coarse colluvial and weathered bedrock, and glacial drift. Virtually the entire area is underlain by permafrost.

The **Arctic Foothills MLRA** occupies most of the northwestern part of the planning area. Broad sloping valleys separated by steep ridges, hills, and knolls dominate the landscape. Elevations range from near sea level to about 3,000 feet on hills and ridges near the Brooks Range. Permafrost underlies all areas. The dominant soils in valleys and slopes were formed from loamy colluvial sediment. Most of the soils on hills and ridges consist of very gravelly material weathered from sedimentary rock. A few soils near the Brooks Range were formed from coarse-gravel glacial drift.

The **Arctic Coastal Plain MLRA** is the most northern part of the planning area. The landscape is dominated by nearly level, low tundra, dotted by shallow thaw lakes. Very poorly-drained fibrous peat soils (commonly under a cover of sedges) occupy broad depressions, shallow drainage ways, and lake borders. Permafrost underlies all areas creating patterned features such as polygons, hummocks, frost boils, and pingos.

INSERT 11x17 MAP
**3_1_soil_mlra**

INSERT 11x17 MAP
**3_2_soil_permafrost**

# 4. Water Resources

Water resources of the planning area consist largely of surface water streams, lakes, and ponds, while groundwater and springs are generally limited. Climate and permafrost are the dominant factors limiting water availability. Several communities within the planning area depend on rivers, lakes, or springs for municipal water sources. These are shown on Map 3-4.

The region's climate reflects a combination of continental and maritime factors, as described in the Air Quality section on page 3-4. Because winters are long, most streams and lakes are frozen for much of the year. Summers, while short and relatively cool near the coast, are often longer and warmer inland. Generally, the planning area is snow-covered from October to May. In coastal areas, prevailing winds blow cold air off the largely frozen Bering and Chukchi seas, often creating blizzard conditions that drift and compact the snow. A little less than half of the total annual precipitation occurs as snow during the winter months (NRCS 2004). Late winter snowpack in the planning area is greatest in the foothills south of the Brooks Range and decreases northward to the coast (Sturm 2001). Snowmelt is a dominant factor in Arctic hydrology because it contributes the majority of the annual runoff for lakes and streams. While rainfall is usually light during the short summers, heavier rainstorms can occur in July and August, especially in the southern and western foothills of the Brooks Range, Nulato Hills, and Seward Peninsula. The average annual precipitation in the planning area is shown in Map 3-3.

The absence of significant groundwater resources in the planning area is due largely to the presence of permafrost (Dorava 1995, Dorava and Brekken 1995). Permafrost forms a confining barrier that prevents infiltration of surface water, helps maintain a saturated layer of surface soils, and generally restricts groundwater sources to shallow, unfrozen material beneath deep lakes and rivers or saline waters from very deep wells. Melting of ice-rich permafrost can cause surface subsidence, termed thermokarst, resulting in thaw lakes, ponds, or beaded stream channels. For more information on permafrost, see the permafrost discussion beginning on page 3-8 in the Soil Resources section.

While groundwater is not extensive in the planning area, lakes and rivers deeper than about 6 feet remain unfrozen at depth most winters, creating a layer of unfrozen sediments (taliks) beneath (Sloan 1987). When the sediments consist of porous materials, such as sand or gravel, an aquifer suitable for pumping groundwater may exist. Nelson and Munter (1990) describe taliks beneath deep river pools of Arctic rivers as a series of discrete units separated by permafrost barriers. The barriers result from the riverbed freezing beneath shallow riffles. This indicates that the supply of groundwater is directly related to the size of the pool in the river.

Landsat-imagery analysis has located numerous groundwater springs in the planning area by identifying the large overflow icings (aufeis) created downstream from the spring during the winter. Some of these springs were examined by Childers et al. (1979) and were found to have good water quality comparable to the surface waters of the area. Springs are important as they are the major source of flowing water during the long winter in Arctic Alaska. These springs support an abundance of aquatic organisms, often well out of proportion to the relatively small size of the spring (Childers et al. 1979). Nome derives most of its drinking water from springs north of town near the base of the Anvil Mountains (Dorava 1995) (Map 3-4).

While hydrologic data for the planning area are sparse (Brabets 1996), all streams share somewhat unique streamflow characteristics. Flow generally is limited or nonexistent most of the winter. Streamflow begins in late May or early June as a rapid flood event termed break-up, which, combined with ice and snow damming, can inundate extremely large areas in a matter of days. More that half of the annual discharge for a stream can occur during a period of several days to a few weeks (Sloan 1987). Most streams continue to flow throughout the summer but at relatively low discharges. Runoff is confined to the upper organic layer of soil, as the mineral soils are saturated and frozen below a shallow, unfrozen zone termed the active layer (for more information on permafrost and the active layer, see the permafrost discussion beginning on page 3-8 in the Soil Resources section). Rainstorms sufficient to cause flooding are generally limited to rivers that originate in the foothills south of the Brooks Range, Nulato Hills, and Seward Peninsula.

Physiographic boundaries can be used to divide streams in the planning area into three types: Arctic, coastal, and interior. The presence of sea ice during the winter and spring, however, can alter the boundaries between the continental and maritime climatic zones.

## a) Arctic Streams

Arctic streams are often grouped by their physiography and the location of their headwaters into three categories: coastal, foothills, or mountains (Sloan 1987). Most of the Arctic coastal plain and lower foothills can best be characterized as a mosaic of tundra wetlands. Because permafrost prevents water from entering the ground and low relief limits runoff, the coastal plain is covered with lakes, ponds, and generally slow-moving streams. Many of the smaller drainages are choked with aquatic vegetation. Shallow-water tracks may result from snowmelt flooding the permafrost terrain, often conveying significant discharge where surface relief is limited (Hinzman et al. 1993). The peak flow is the highest per unit of area is always due to snowmelt runoff (Sloan 1987).

The Arctic foothills that comprise the northern portion of the planning area are characterized by a series of low, tundra-covered hills and flat-topped ridges that seldom exceed 1,000 feet in elevation. Arctic streams that originate in these foothills are somewhat steeper and consequently have more gravel-bar and cut-bank features than those of the coastal plain. These streams tend to break up earlier, freeze up later, and have a slightly higher runoff. Several of the larger rivers in the planning area originate in the Brooks Range and flow north towards the Arctic Ocean. These rivers exhibit the steepest gradient, and therefore the greatest range of geomorphic features: steep cut-bank cliffs, deep pools, boulder riffles, and braided channels flowing across extensive gravel flats. Data for many of these Arctic streams are summarized in Childers et al. (1979).

## b) Coastal Streams

True coastal streams (those that are largely in a maritime climate, as described on page 3-4 in the Air Quailty section), are limited to the southern Seward Peninsula. Coastal streams are more strongly affected by rainfall than by snow and ice, such that most peak flows are generally due to rainfall in late summer or early fall. These streams are generally smaller than interior streams, but they have proportionally larger winter flows than streams that originate in the interior. Coastal streams provide important aquatic habitat for anadromous and resident fish populations (see the Fish section beginning on page 3-47 for information on the species present

in the planning area). Data for these streams can be found in Dorava (1995), Dorava and Brekken (1995), and numerous BLM fisheries inventories as described in the Fish section beginning on page 3-47. Many of the coastal streams north of the Seward Peninsula are considered transitional with the Arctic streams as the sea ice creates more extreme weather during the winter and spring, limiting winter flows and increasing the magnitude of snowmelt runoff.

## c) Interior Streams

Interior streams in the planning area originate in the southern and western foothills of the Brooks Range, the Nulato Hills, and the other low hills south of the Noatak River and Kobuk River valleys. These streams have limited to moderate winter flow, with large increases at break-up in the spring. The peak flow for most years is due to snowmelt runoff. Streamflow is moderate for most of the summer, with an occasional rise due to rain storms. While the larger rivers such as the Kobuk and Noatak support anadromous and resident fish populations, many smaller interior streams lack sufficient winter flow to support over-wintering fish populations. Water quality of interior streams is generally very good (Brabets 2001, Childers and Kernodle 1981, 1983).

## d) Lakes and Ponds

Lakes and ponds are the most common feature on the Arctic coastal plain, in the lower valleys of the Kobuk, Noatak, Selawik, Kuzitrin, Fish, and Buckland rivers, and in McCarthy's Marsh and the Pah River Flats. Unlike streams, which only hold large quantities of water during break-up, lakes store water year-round and are the most readily available water source in the planning area (Sloan 1987, Dorava and Brekken 1995). Most lakes and ponds originate from the thawing of ice-rich sediments (Sellman et al. 1975). This results in a continuum known as the thaw lake cycle, wherein lakes form, expand, and then drain in response to perturbations of the permafrost terrain. On the North Slope, these lakes and ponds often are elongated with a strong north-south orientation. This results from preferential erosion due to wind generated waves, leeward end currents, and associated higher water temperatures that melt the ice at the narrower ends of the lakes (Carson and Hussey 1960). Since waterbodies with depths less than about 6 feet generally freeze to the bottom most winters, lake depth is the primary factor in winter water supply. Most deep lakes are less than 20 feet deep as the depth of thaw lakes appears to be controlled by the ice volume and porosity in the original sediments, which decrease with increasing depth (Sellman et al. 1975). Deep lakes, because they do not freeze to the bottom, provide an overwintering area for fish and aquatic invertebrates and are the most readily available winter water supply. Kotzebue derives most of its drinking water from lakes southeast of town (Dorava and Brekken 1995). Limited water quality data for McCarthy's Marsh and the Kuzitrin River wetlands can be found in Brown and Jandt (1992). In the ten ponds sampled in 1990 and 1991, pH ranged from slightly acidic to slightly basic and hardness was relatively low, similar to the values shown for the unnamed lakes in Table 3-1.

A map of water resources of the planning area (Map 3-5) shows major rivers, watershed boundaries, and stream survey (gauging) sites. The data for BLM watershed inventories from 2004 and 2005 is listed in Table 3-1, while the U.S. Geological Survey (USGS) and University of Alaska Fairbanks (UAF) data is available on the Web at http://waterdata.usgs.gov/ak/nwis/current/?type=flow.

**Table 3-1. Water Resources Data for Selected Rivers in the Planning Area (2004-05)**

| Site # | Site Name | Latitude | Longitude | Date surveyed | Discharge cfs | Water temp °C | pH | Spec. Cond. ms/cm | Turbidity NTU | Hardness ppm |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Squirrel River at Omar River | 67.1237 | -160.9885 | 8/26/2004 | *e* 2000 | 9.5 | 7.6 | 292 | 0.8 | 172 |
| 2 | Timber Creek | 67.2660 | -160.7302 | 8/26/2004 | 148 | 9.0 | 7.4 | 297 | 0.5 | 160 |
| 3 | Middle Fork Tributary Squirrel River | 67.3433 | -161.3009 | 8/26/2004 | 225 | 12.0 | 7.7 | 250 | 0.1 | 148 |
| 4 | West Fork Tributary Squirrel River | 67.2820 | -161.7296 | 8/26/2004 | 316 | 13.0 | 7.6 | 300 | 0.2 | 184 |
| 5 | Kukpowruk River | 68.5512 | -163.3322 | 8/28/2004 | 147 | 6.5 | 7.7 | 390 | 0.4 | 220 |
| 6 | Ipewik River | 68.5868 | -164.1376 | 8/28/2004 | 138 | 9.0 | 7.9 | 457 | 0.2 | 248 |
| 7 | NE Tributary Kukpuk River | 68.3659 | -164.3325 | 8/28/2004 | 29 | 12.0 | 7.7 | 450 | 132 | 224 |
| 8 | West Fork Tributary Wulik River | 68.0676 | -163.5209 | 8/28/2004 | 213 | 10.0 | 7.8 | 305 | 0.1 | 162 |
| 9 | Ikalukrok Creek (USGS site) | 68.0492 | -163.0287 | 8/28/2004 | 169 | 10.0 | 7.6 | 580 | 0.4 | 312 |
| 10 | Middle Fork Tributary Kivalina River | 68.1114 | -164.0232 | 8/30/2004 | 150 | 9.5 | 7.7 | 266 | 1.2 | 164 |
| 11 | NW Tributary Kukpuk River | 68.2682 | -164.8559 | 8/30/2004 | 103 | 7.0 | 7.4 | 422 | 18.5 | 208 |
| 12 | Singoalik River | 68.0210 | -164.8776 | 8/30/2004 | 29 | 9.5 | 7.9 | 285 | 1.2 | 176 |
| 13 | Kivalina River above East Fork Tributary | 68.0557 | -164.2775 | 8/30/2004 | 156 | 9.0 | 7.6 | 281 | 2.5 | 160 |
| 14 | East Fork Tributary Kivalina River | 68.0308 | -164.1232 | 8/30/2004 | 222 | 6.0 | 7.4 | 242 | 2.1 | 134 |
| 15 | Ungalik River | 64.8013 | -160.4490 | 8/31/2004 | 618 | 8.5 | 8.6 | 219 | 1.3 | 128 |
| 16 | Inglutalik River | 65.0840 | -160.3643 | 8/31/2004 | 426 | 10.0 | 8.4 | 324 | 1.3 | 200 |
| 17 | East Fork Koyuk River | 65.2564 | -160.5988 | 8/31/2004 | 131 | 8.0 | 8.2 | 300 | 1.2 | 184 |
| 18 | West Fork Buckland River | 65.7143 | -160.5552 | 8/31/2004 | 412 | 11.0 | 7.3 | 148 | 2.6 | 104 |

| Site # | Site Name | Latitude | Longitude | Date surveyed | Discharge cfs | Water temp °C | pH | Spec. Cond. ms/cm | Turbidity NTU | Hardness ppm |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | Fish River near Buckland | 65.9130 | -160.4725 | 8/31/2004 | 185 | 10.0 | 7.4 | 30 | 4.3 | 68 |
| 20 | Agiapuk River | 65.3670 | -165.6605 | 8/10/2005 | 715 | 12.0 | 7.4 | 354 | 1.7 | 176 |
| 21 | Pilgrim River | 64.9170 | -164.9585 | 8/12/2005 | 558 | 15.0 | 7.3 | 145 | 1.5 | 68 |
| 22 | Niukluk river | 65.1007 | -164.0518 | 8/12/2005 | 503 | 15.0 | 7.3 | 102 | 1.0 | 44 |
| 23 | Libby River | 65.1153 | -164.2528 | 8/12/2005 | 74 | 14.0 | 7.2 | 62 | 0.8 | 24 |
| 24 | Fish River | 65.2213 | -163.1982 | 8/13/2005 | 134 | 7.0 | 7.2 | 78 | 1.0 | 36 |
| 25 | Boston Creek | 65.2057 | -163.3303 | 8/13/2005 | 374 | 12.0 | 7.3 | 167 | 0.7 | 80 |
| 26 | Etehepuk River | 64.9125 | -162.7946 | 8/13/2005 | 190 | 15.0 | 7.4 | 173 | 0.8 | 80 |
| 27 | Upper Kivalina River | 68.2739 | -163.9127 | 8/14/2005 | 80 | 10.0 | 7.4 | 315 | 1.2 | 144 |
| 28 | Upper Wulik River | 68.3266 | -163.0974 | 8/15/2005 | 216 | 12.0 | 7.4 | 433 | 1.0 | 228 |
| 29 | Middle Fork Tributary Kivalina River | 68.2202 | -163.8239 | 8/15/2005 | 309 | 13.0 | 7.5 | 305 | 0.9 | 156 |
| 30 | Sooner River | 68.5352 | -163.3440 | 8/16/2005 | 141 | 12.0 | 7.3 | 480 | 0.9 | 224 |
| 31 | Kokolik River | 68.7954 | -162.0726 | 8/16/2005 | 306 | 13.0 | 7.5 | 548 | 0.9 | 280 |
| 32 | North Fork Buckland River | 65.7678 | -160.0037 | 9/3/2005 | ND | 5.0 | 7.0 | 52 | 2.3 | 32 |
| 33 | South Fork Buckland River | 65.6813 | -159.8057 | 9/4/2005 | ND | 6.0 | 7.6 | 354 | 2.2 | 192 |
| 34 | Upper Tagagawik River | 65.6177 | -158.9841 | 9/4/2005 | ND | 6.0 | 7.3 | 260 | 1.0 | 152 |
| 35 | Unnamed Lake #1 near Kivalina River | 68.0041 | -163.9938 | 8/14/2005 | ND | 20.0 | 6.6 | 45 | 5.4 | 20 |
| 36 | Unnamed Lake #2 near Squirrel River | 67.3228 | -161.7872 | 8/14/2005 | ND | 22.0 | 6.9 | 55 | 2.2 | 32 |
| 37 | Unnamed Lake #3 near Squirrel River | 67.2207 | -161.0043 | 8/15/2005 | ND | 21.0 | 7.0 | 27 | 1.6 | 16 |

Note: These sites are shown on Map 3-5. ND = not determined. *e* = estimated

INSERT 11x17 MAP
**3_3_hydro_precip**

INSERT 11x17 MAP
**3_4_hydro_municipal**

INSERT 11x17 MAP
**3_5_hydro_huc**

# *5. Vegetation*

The 13 million acres of BLM-managed land within the Kobuk-Seward Peninsula planning area contain a diverse mix of habitats spanning coastal and interior landscapes. The region is characterized by vast expanses of tussock tundra and shrublands. Portions of major river corridors and protected south-facing slopes support open boreal forest conifer and hardwood species, especially in eastern sections of the planning area. Many wind-scoured mountain ridges and slopes that appear barren host alpine plant communities of ground-hugging mat and cushion plants and small pockets of alpine meadow.

## a) Preliminary Vegetation Classification

Most of the 31.6 million acres of the planning area have been mapped at a 30 meter (98 foot) resolution as a result of the combined efforts of a BLM-Ducks Unlimited partnership, the USDA NRCS (Seward Peninsula), and the National Park Service (Noatak National Preserve, Kobuk Valley National Park, and Cape Krusenstern National Monument). However, about 12 percent of the planning area has not been mapped to this fine scale (unmapped areas include Point Hope, Cape Lisburne, Point Lay, and the western Brooks Range). In addition, work is still in progress to consolidate differing vegetation categories among the three Federal agency land cover classifications. Therefore, the vegetation classification for the planning area is based on statewide mapping coverage of one kilometer resolution (Fleming 1996).

The broad scale vegetation classification for the planning area consists of 13 vegetation types plus categories for Water, and Glaciers and Snow. The statewide vegetation classification includes four forest types and one shrubland type that are not found in the planning area, plus a category for Ocean Water. The 13 vegetation types are sorted under three groups according to the life-form of the dominant species: Forest (five vegetation types), Shrublands (five vegetation types), and Herbaceous (three vegetation types). Acres and percentages of each of these vegetation types are listed in Table 3-2. Map 3-6 illustrates the vegetation distribution across the planning area.

**Table 3-2. Vegetation Types Within the Planning Area**

| Vegetation Type | Within Planning Area | | On BLM-managed Lands | |
|---|---|---|---|---|
| | Acres | Percent | Acres | Percent |
| **Forest** | | | | |
| Open and Closed Spruce Forest | 1,482 | .00 | 1,235 | .01 |
| Open Spruce and Closed Mixed Forest Mosaic | 10,872 | .04 | 9,637 | .07 |
| Open Spruce Forest/Shrub/Bog Mosaic | 1,246,395 | 4.18 | 533,500 | 4.08 |
| Spruce Woodland/Shrub | 1,017,329 | 3.42 | 448,496 | 3.43 |
| Spruce and Broadleaf Forest | 3,706 | .01 | None | --- |
| Total | 2,279,784 | 8 | 992,868 | 8 |
| **Shrubland** | | | | |
| Alpine Tundra and Barrens | 1,178,441 | 3.96 | 552,033 | 4.23 |
| Dwarf Shrub Tundra | 1,077,128 | 3.62 | 618,257 | 4.73 |
| Low Shrub/Lichen Tundra | 139,861 | .47 | 122,317 | .94 |
| Tall and Low Shrub | 8,981,750 | 30.15 | 4,736,021 | 36.26 |
| Tall Shrub | 577,730 | 1.94 | 375,353 | 2.87 |
| Total | 11,954,910 | 40 | 6,403,981 | 49 |
| **Herbaceous** | | | | |
| Wet Sedge Tundra | 97,853 | .33 | 13,343 | .10 |
| Tussock Sedge/Dwarf Shrub Tundra | 10,231,645 | 34.35 | 3,930,458 | 30.09 |
| Moist Herbaceous/Shrub Tundra | 5,225,764 | 17.54 | 1,721,830 | 13.18 |
| Total | 15,555,262 | 52 | 5,665,631 | 43 |

Note: Acreage calculations in this table are based on a raster dataset with 1 kilometer pixel resolution, resulting in acreage totals that are slightly lower that shown elsewhere in this document. Acres rounded to the nearest 1 acre.

### *(1) Forest Vegetation Types*

Forested terrain covers approximately 8 percent of the BLM-managed lands within the planning area. The six main areas in the planning area characterized by forested landscapes are the southeast corner of the Seward Peninsula, the Nulato Hills, the Selawik River, the Kobuk River, the Squirrel River, and the lower Noatak River. Forest communities in the planning area are primarily open-canopied woodlands dominated by white spruce (*Picea glauca*). White spruce will tolerate a wide range of site conditions, but grows best on well-drained soils of gentle, south-facing slopes or deeper soils of protected river valleys. Stands of black spruce (*Picea mariana*) occupy low, poorly drained areas with fine-grained soils, or occasionally dominate stands of regrowth after fire. Paper birch (*Betula papyrifera*) is scattered in small groves in some areas at protected sites with porous, deeper soils. Balsam poplar (*Populus balsamifera*) stands form narrow, linear units along stable river banks or isolated groves along upland creek banks. Small, stunted quaking aspen (*Populus tremuloides*) are occasionally found in the most interior portions of the planning area on dry, warmer soils of south-facing slopes or low hilltops. Mixed forest types are also common, composed of varying amounts of deciduous trees (paper birch, balsam poplar, and aspen) scattered in with spruce.

Vegetation types within the Forest classification that are located in the planning area are: Open and Closed Spruce Forest, Open Spruce and Closed Mixed Forest Mosaic, Open Spruce Forest/Shrub/Bog Mosaic, Spruce Woodland/Shrub, and Spruce and Broadleaf Forest. The Spruce Woodland/Shrub community often has conspicuous amounts of lichen as ground cover and provides important habitat for caribou during migration.

### *(2) Shrubland Vegetation Types*

Shrubland communities cover approximately 49 percent of BLM-managed lands within the planning area. Compared to the five tree species comprising Forest communities, at least 51 species have a shrubby growth habit (multiple, woody stems). Willow (*Salix*, 17 species), alder (*Alnus*, two species), and dwarf birch (*Betula*, two species) are the most common and abundant shrubs, though numerous other shrub species occur, many in the heath family (*Ericaceae*, 16 species) and rose family (*Roseaceae*, six species). Shrubs in the planning area may range from a mere one-quarter inch high to almost 10 feet tall. Prostrate shrubs such as mountain avens (*Dryas* spp.), skeletonleaf willow (*Salix phlebophylla*), and alpine azalea (*Loisleuria procumbens*) form low mats on exposed mountain slopes and ridges. Dwarf shrubs such as Labrador tea (*Ledum palustre*) and low-bush cranberry (*Vaccinium vitis-idaea)* may be a dominant component of various tundra plant communities, growing intermingled with sedges and grasses, forbs, and lichens and mosses. Low to medium height shrubs such as resin birch (*Betula glandulosa*) and American green alder (*Alnus crispa*) can blanket lowland or subalpine slopes with open or dense thickets, while river and stream banks may be heavily grown with low to medium height willows such as diamondleaf willow (*Salix pulchra*) or Richardson willow (*Salix richardsonii*). The most common and abundant tall shrub in the planning area is feltleaf willow (*Salix alaxensis*), which often dominates extensive river floodplains and river banks.

Vegetation types within the Shrubland classification located within the planning area are: Alpine Tundra and Barrens, Dwarf Shrub Tundra, Low and Dwarf Shrub, Low Shrub/Lichen Tundra, Tall and Low Shrub, and Tall Shrub.

### *(3) Herbaceous Vegetation Types*

Herbaceous plant communities cover approximately 43 percent of the BLM-managed lands within the planning area. Herbaceous plants can be annual or perennial; they have no woody parts. Included in this broad category are both vascular plants (seed forming) and non-vascular plants (spore forming) such as ferns, horsetails, mosses, and lichens.

True grassland communities are important ecosystems in the western United States but are relatively rare in Alaska. Within the planning area, grassy meadows are sometimes found at lake margins, in recently drained lake beds, recently disturbed areas, floodplains, and coastal beaches. These communities are frequently dominated by bluejoint grass (*Calamagrostis canadensis*), beach ryegrass (*Elymus* spp.), or native fescues (*Festuca* spp.). In contrast, tundra herbaceous communities cover large areas in Alaska, including the planning area. Wet, lowland tundra is found mainly on coastal plains and low-lying river deltas. The dominant type of plant community is a wet sedge meadow of tall cottongrass (*Eriophorum angustifolium*) and water sedge (*Carex aquatilis*). Drier portions of lowland tundra are characterized by tussock cottongrass (*Eriophorum vaginatum*), a tussock-forming sedge. Moist or dry upland tundra is also often dominated by extensive areas of tussock cottongrass. Interspersed with sedges in all these herbaceous communities are varying amounts and species of forbs, grasses, rushes, dwarf and prostrate shrubs, mosses, and lichens. Lichen tussock tundra (an ecological site component of the broader category Tussock Sedge/Dwarf Shrub Tundra) is very important habitat for caribou and reindeer during winter months and migration, as it normally has a range of 25-50 percent lichen cover (Swanson et al. 1985).

Vegetation types within the Herbaceous classification that are located within the planning area are: Wet Sedge Tundra, Tussock Sedge/Dwarf Shrub Tundra, and Moist Herbaceous/Shrub Tundra.

## b) Upland and Riparian Vegetation

The vegetation in the planning area is primarily in a natural state, with widespread healthy plant communities present in various seral stages from early succession to climax, showing adaptation to natural disturbances. Natural disturbances include fire, insects and disease, ice scour, flooding, erosion, and grazing/browsing by wildlife. Roads are few and short; villages are few, small, and scattered; areas with mining activity are small and isolated; and grazing pressure from livestock (reindeer) is currently light. Off-highway vehicle (OHV) use is generally confined to areas near villages, Native allotments, and a few recreation use areas (e.g., the Squirrel River Valley), though snowmachine travel is widespread.

Determining the appropriate level of fire protection for forest, shrubland, and herbaceous communities with substantial lichen components is an important consideration. Caribou- and reindeer-preferred lichen species, especially *Cladina*, *Cladonia*, and *Cetraria*, grow very slowly, requiring 50-100 years or longer to regain optimal cover and biomass after fire (Swanson 1996). Currently the winter, migration, and peripheral ranges of the Western Arctic Caribou Herd (WACH) are classified with a Fire Management Option of Limited. Lands with a Limited designation generally receive a lower priority for initial attack resources, and responses are typically associated with surveillance to determine if specific values are threatened (more information on Fire Management Options and how they are applied begins on page 3-107). Based on WACH historic and current seasonal range maps developed by the Alaska Department of Fish and Game (ADF&G) (Dau in prep) in 2000 and merged with BLM Alaska Fire Service fire history data from 1950 through 2004 (BLM 2005a), 18.8 percent of the WACH winter range has burned at least once since 1950, and in some areas more than once (Map 3-7). Using these same ADF&G and Alaska Fire Service datasets, 11.5 percent of the WACH outer range (extending well into the Seward Peninsula) has burned one or more times. In contrast, less than one percent of calving and summer ranges on the North Slope have burned, as the wet tundra and infrequent lightning strikes there result in very few fires. Only 5.9 percent of the WACH migratory range has burned one or more times.

Forest health issues are beginning to emerge in the south and southeastern portions of the Seward Peninsula. A spruce beetle infestation (*Dendroctonus rufipennis*) was documented by the BLM in August 2003 when areas of conspicuous beetle-killed spruce were observed and aerially photographed in the upper Tubutulik River region on the east side of the Darby Mountains (Sparks 2003). In 2004, the annual statewide aerial survey conducted by the USDA Forest Service and the Alaska Department of Natural Resources (ADNR), Division of Forestry, reported 81,389 acres of beetle-killed spruce on Elim Native Corporation lands along the coast and inland from Moses Point to Mount Kwiniuk (Map 3-23). This outbreak appeared to have peaked within the last few years, with current activity being very light. USDA Forest Service and ADNR Division of Forestry personnel estimated a near total loss of the forest resource in that area (Wittwer 2005). The 2004 statewide aerial survey also documented an area of light to moderate spruce beetle activity north of the village of White Mountain along the Fish River. Mapping showed 8,681 acres of beetle-affected spruce, with the majority characterized as light intensity (Wittwer 2005). Smoke from tundra wildfires in McCarthy's Marsh prevented additional survey in this region during the summer of 2004. Please refer to the discussion on spruce

beetles beginning on page 3-137 in the Forest Products section for additional information on spruce beetle activity on the Seward Peninsula and other locations within the planning area.

Lichen-rich plant communities, an important habitat in the planning area, are subject to increasing grazing pressure from the WACH as the herd continues to grow steadily in size and expand its seasonal range. Twenty permanent vegetation transects in caribou winter range in the Buckland River Valley, Selawik Hills, and the northern Nulato Hills were established by the BLM in 1981 when herd size was 140,000. In 1995, when herd size had increased to 450,000, sampling of the transects showed a 14 percent decline in lichen cover from 1981 levels (Jandt et al. 2003). In 2003, herd size had risen to 490,000 (Dau, in prep). This downward trend in lichen cover is based on the average lichen cover from 20 164-foot long transects established in 1981, and compared with average lichen cover from 18 of these transects relocated in 1995. Realizing that there were only 18 permanent transects deployed over the approximately 11,405,000 acres of caribou winter range, seven more were added in 1996, for a total of 25. Even though the actual area sampled is small, the transects are spread reasonably well through representative habitats the WACH uses during the winter months in the Buckland River Valley, Selawik Hills, and northern Nulato Hills. Growth and eventual decline of the WACH will continue to have an influence on vegetation in the planning area, but fluctuations are a part of the natural cycle played out over hundreds of years. For more information on the WACH, see the caribou discussion beginning on page 3-56 in the Wildlife section.

Monitoring of reindeer grazing allotments on the Seward Peninsula by the BLM and the NRCS from the late 1980s through 2004 has occasionally documented specific locations of limited acreage with moderate to severe impacts on vegetation from reindeer. This damage includes trampled and fragmented lichens, cratering (see Glossary) to organics or mineral soil, and heavily browsed willows and dwarf Arctic birch (Meyers 1995, 1996, 1997a). However, given sufficient years of rest from grazing those areas will recover fully (Swanson et al. 1985). An improvement in condition is apparent at some of these same and nearby sites (Meyers 2003b, Meyers 2004d) due to the steady drops in size or complete absence (on some grazing allotments) of Seward Peninsula reindeer herds (Finstad et al. 2005, Meyers 1997b).

Since 1987, reindeer numbers on the Seward Peninsula have decreased by 75 percent (Finstad et al. 2005) due to mixing with caribou herds, leaving their usual grazing ranges, and often dying partly due to animal and human predation (Fitzgerald 2002). Over 16,000 reindeer have disappeared since 1987, with some herders losing 45-85 percent of their animals, while six herders have lost all of their reindeer (Fitzgerald 2002). Thus most reindeer allotments on the Seward Peninsula have been lightly grazed or ungrazed by reindeer during the last 10-15 years.

No riparian condition surveys have been conducted by the BLM in the planning area due to lack of adequate funding and personnel to target 13 million acres of BLM-managed lands within the 31.6 million acre planning area. However, recent aerial and ground reconnaissance surveys of water quality and channel morphology within the planning area have noted that riparian conditions are generally undisturbed and functioning well (See Table 3-1). Studies done in the Kobuk and Noatak river basins of the planning area indicate water quality and riparian stability of these major drainages are generally excellent, although further monitoring was recommended (Brabets 2001, Childers and Kernodle 1983, Childers and Kernodle 1981). Additionally, one region directly adjacent to the southern boundary of the planning area, the Unalakleet River drainage, has been assessed by the BLM Anchorage Field Office. Results of their summer 2000 aerial photography survey showed that all streams in the Unalakleet River drainage were in proper functioning condition (Scott 2000).

## c) Rare Plants Not Classified as BLM-Alaska Special Status Species

The BLM-Alaska Special Status Species (SSS) list includes 32 sensitive plant species found within Alaska, all of which are ranked S1, S2, or S2S3 by the Alaska Natural Heritage Program (ANHP). These species are listed in Table 3-5 on page 3-72 and referenced on Map 3-8, and descriptions of the rankings are listed in Table 3-6 on page 3-73. Many species on this list do not occur within the planning area. Conversely, other rare plants not on the current BLM-Alaska SSS plant list were evaluated as important to include in the RMP analysis. These species will also be included in the periodic review process of the BLM-Alaska SSS plant list.

The following section describes individual species of rare plants, including S1-S2S3 species to be considered for addition to BLM-Alaska SSS list, and S1-S2S3 species with a reasonable potential to occur on botanically unexplored portions of BLM-managed lands within the planning area. Descriptive paragraphs cover species locations, brief habitat data, population numbers, and trends (if known), any known threats, and rare plant rankings. See Table 3-3 for a list of the rare plant species described in the text, showing their scientific and common names plus ANHP-assigned ranks.

**Table 3-3. BLM-Alaska Sensitive Plant Species and Other Rare Plant Species Known to Occur Within the Kobuk-Seward Peninsula Planning Area**

| Scientific Name | Common Name | ANHP Ranking | BLM Sensitive Species in 2004? | Remarks |
|---|---|---|---|---|
| *Artemisia globularia* var. *lutea* | purple wormwood | G4T1T2Q S1S2 | Yes | |
| *Artemisia senjavenensis* | yellow-ball wormwood | G3 S2S3 | Yes | |
| *Beckwithia glacialis* ssp. *alaskensis* | Alaskan glacier buttercup | G4T3T4 S2 | Yes | Recent taxonomic change tentatively shows this taxon as *Ranunculus glacialis.* |
| *Cardamine microphylla* ssp. *blaisdellii* | small-leaf bittercress | G4T3T4 S2S3 | No | |
| *Carex heleonastes* | Hudson Bay sedge | G4 S2S3 | No | |
| *Douglasia beringensis* | Bering dwarf primrose | G2 S2 | Yes | |
| *Gentianopsis detonsa* ssp. *detonsa* | sheared gentian | G3G4T? S1 | No | |
| *Oxytropsis arctica* var. *barnebyana* | Barneby's milkvetch | G4?T2 S2 | Yes | |
| *Oxytropis kobukensis* | Kobuk locoweed | G2 S2 | Yes | Endemic to sand dune habitat in Kobuk Valley National Park. |
| *Pedicularis hirsuta* | hairy lousewort | G5? S1 | Yes | |
| *Potentilla fragiformis* | strawberry cinquefoil | G4? S1 | No | |
| *Potentilla stipularis* | stipulated cinquefoil | G5 S1 | Yes | |
| *Primula tschuktschorum* | Chukchi primrose | G2G3 S2S3 | No | |
| *Ranunculus auricomus* | goldilocks buttercup | G5 S1S2 | No | |

| Scientific Name | Common Name | ANHP Ranking | BLM Sensitive Species in 2004? | Remarks |
|---|---|---|---|---|
| *Ranunculus glacialis* ssp. *camissonis* | Glacier buttercup | G4T3T4 S2 | No | |
| *Rumex krausei* | Cape Krause sorrel | G2 S2 | No | Present on initial draft BLM Alaska SSS list – omitted from final in error. |
| *Saussurea triangulata* | Waring Mountain saw-wort | G1 S1 | No | Shown as *Saussurea* sp. 1 on ANHP tracking list. |
| *Smelowskia johnsonii* | Johnson's smelowskia | G1 S1 | No | |
| *Trisetum sibiricum* ssp. *litorale* | Siberian oatgrass | G5T4Q S2 | No | |

***Cardamine microphylla* ssp. *blaisdellii* (small-leaf bittercress).** This small member of the mustard family is a Beringian endemic initially discovered on the Seward Peninsula and the adjacent Chukotka Peninsula, Russia. Recent botanical inventories have pushed its known range both east to the Jade and Angayucham mountains in the upper Kobuk River valley on National Park Service (NPS) land (Parker 2004a), and south to Debauch Mountain and the North Fork, Unalakleet River, on BLM lands in the southern Nulato Hills in 1997 and 1998 (Parker 1999) (Map 3-8). It is usually found in sheltered, herbaceous alpine snowmelt areas. Information on population size, trend data, and potential threats is not available.

Ranking: ANHP – G4T3T4/S2S3.

***Carex heleonastes* (Hudson Bay sedge).** This rare northern sedge is found in peat bogs and seeps, with large gaps in its circumpolar distribution across Alaska, Canada, Greenland, and Eurasia. It has been collected at only one location within the planning area, on Native lands near the airstrip at Pilgrim Hot Springs, in southcentral Seward Peninsula (UAF 2005b) (Map 3-8). Other collection sites in Alaska include Nutuvukti Lake (near the headwaters of the Kobuk River), eastern Brooks Range, southcentral Alaska Range, and northwestern Kenai Peninsula (UAF 2005b). Information on population size, trend, and potential threats is not available.

Ranking: ANHP – G4/S2S3.

***Gentianopsis detonsa* ssp. *detonsa* (sheared gentian).** Known distribution is restricted to five locations in coastal northwest Alaska (all within the planning area) (Map 3-8) and to approximately three locations along the Arctic coast of Canada's Northwest Territories. It blooms briefly, with deep purple petals, along silty shorelines of brackish lagoons and estuaries, or in moist loams of back beach swales and shoreline meadows. *G. detonsa* ssp. *detonsa* occurs as small isolated populations at Sheshalik spit (west of the Noatak River delta), Kotzebue, Arctic Circle lagoon (Baldwin Peninsula), Kiwalik spit at the mouth of the Kiwalik River, and just east of the mouth of the Goodhope and Cripple rivers, on the north coast of the Seward Peninsula. However, in an exceptionally good year, one particular site at Sheshalik spit may produce several thousand individuals (Uhl 2000). These locations are a patchwork of State- and Native-selected lands, Native allotments, and NPS lands (Map 3-8).

In July 1995 a BLM/Fish and Wildlife (FWS) field crew estimated approximately 60 individuals in a two-mile stretch of lagoon shoreline at Arctic Circle lagoon (Native- and State-selected, and private land) (Meyers 1995b). In August 2000 about 50-60 individuals were discovered on a low

vegetated beach ridge just east of the mouth of the Goodhope and Cripple rivers within the Bering Land Bridge National Preserve (Meyers 2000a).

Over 100 years of contemporary human habitation at Kotzebue has resulted in the gradual filling in (through the construction of gravel pads, roads, and airport) and compaction of wetlands once prominent at the northern tip of the Baldwin Peninsula. The tiny remnant stands of a few individuals in disturbed habitats around Kotzebue may have originally been larger. Human activities during the last 16 years in Kotzebue have adversely impacted the few remaining plants there (Meyers 2004b). The lagoon/estuary/ocean shoreline habitat periodically exposes *G. detonsa* ssp. *detonsa* populations elsewhere to ice scour and beach erosion.

Ranking: ANHP – G3G4T?/S1.

***Potentilla fragiformis* (strawberry cinquefoil).** Uncertain taxonomy and misplaced collections resulted in several early Alaska collections (1891-1963) of *Potentilla fragiformis* (UAF 2004) from St. Paul and St. Lawrence islands not being represented in Hulten's monumental *Flora of Alaska and Neighboring Territories* (1968). His range for this species was confined to the Russian Chukotka Peninsula and southwestern Russian coast, although he indicated the total range was unclear. The current known range for *P. fragiformis* has been broadened to include not only the Bering Sea islands mentioned above but also locations within the planning area: the northeast coast of the Seward Peninsula (Kiwalik Spit) and farther northwest (Sheshalik Spit, Cape Krusenstern, and Kivalina) (Map 3-8), based on reevaluation of those early collections, and recent fieldwork in 2001-04 by UAF Herbarium, NPS, and BLM (Parker 2004a). None of these sites are located on BLM-managed land. No information is available on population sizes, trends, or potential threats.

Ranking: ANHP – G4?/S1.

***Primula tschuktschorum* (Chukchi primrose).** This Beringian endemic is generally restricted to the Bering Strait region, found in moist alpine or lakeshore habitats on the Seward Peninsula, on St. Lawrence Island, and on the Chukotka Peninsula (Map 3-8). However there are also a few disjunct populations in the Bristol Bay area. Within the planning area, *Primula tschuktschorum* occurs on NPS and Native corporation lands, as well as on BLM-managed lands. The large Kuzitrin Lake populations are on NPS lands, except for the saddle on Mount Boyan, which is the boundary between NPS land to the north and BLM lands to the south (Map 3-8).

Kuzitrin Lake and surrounding mountain slopes in central Seward Peninsula have the largest known Alaska population of *P. tschuktschorum* (Carlson 2004). In 1995 the population along the southeast shore of Kuzitrin Lake numbered "…thousands of individuals," but most of the flower heads had been nipped off by Canada geese (Kelso 1995). There were also signs of browsing by caribou/reindeer. When Matt Carlson (a University of Alaska Anchorage/ANHP plant conservation biologist) and his field crew visited Kuzitrin Lake in June 2004, they discovered only 500-1,000 *P. tschuktschorum* remaining along the southeast lakeshore. They saw very little seedling recruitment. A more common species of primrose, *Primula eximia*, had apparently greatly expanded its shoreline numbers over the same nine year period. However, additional subpopulations of *P. tschuktschorum* grow on adjacent north-facing slopes and saddle of Mount Boyan, numbering roughly 7,000 in all. These subpopulations at higher elevations had not been grazed (Carlson 2004).

A population of *P. tschuktschorum* recently discovered in 2004 by a BLM/NRCS range management crew on the northwest slope (elevation 2,420 feet) of Mount Bendeleben in southcentral Seward Peninsula consisted of roughly 400-500 healthy individuals, most of which had mature capsules (Meyers 2004c). The *P. tschuktschorum* were growing in a wet seep about 600 feet long, among numerous *Eriophorum angustifolium* (cottongrass) plants. Signs of reindeer and/or caribou use were quite evident: heavily grazed lichen, recent and older hoof prints in damp and dried mud, several pellet groups, and one shed antler. Similar to higher elevations at the Kuzitrin Lake site, there was no evidence of herbivory on the *Primula.* It was speculated that migrating caribou or reindeer may select this site in spring to graze on *Eriophorum* flower heads, when the herbaceous *Primula tschuktschorum* would not be available. Late fall or winter visits by migrating caribou or reindeer would encounter largely withered *Primula*, but the lichen would be readily available (Meyers 2004c).

Kelso (1989) considered *P. tschuktschorum* "rare" (seen at one to two sites) on frost boils in the 9.3 square mile Cape Prince of Wales/Cape Mountain area inventoried at the western tip of the Seward Peninsula.

Heavy grazing pressure on the largest known *P. tschuktschorum* population at Kuzitrin Lake is cause for concern. However, adjacent alpine sites on Mount Boyan and on northwest Mount Bendeleben seem to be secure at present. Size and trend data are not available for additional Bering Strait populations in the Kigluaik Mountains or surrounding lowlands, nor for St. Lawrence Island or Bristol Bay.

Ranking: ANHP – G2G3/S2S3.

***Ranunculus auricomus* (goldilocks buttercup).** This bright yellow-flowered buttercup collected in 1998 on Debauch Mountain in the southern Nulato Hills (BLM-managed lands) turned out to be new to North America (Map 3-8). The lush alpine meadow hosted only a few individuals, supplying the first known record of this northern Eurasian species in North America, collected by a UAF Herbarium/BLM/NPS/ANHP field crew (Parker 1999). This species had actually been collected twice before on the Seward Peninsula, but misidentified, at Serpentine Hot Springs (1987) and Bluff (1988) (Parker 1999). Recent botanical inventory during 2002 and 2003 has located additional populations on the Seward Peninsula in the Kigluaik Mountains and Penny River uplands, plus a northern outlier in the Igichuk Hills adjacent to the lower Noatak River (UAF 2004) (Map 3-8). All known collections are within (or very closely adjacent to) the planning area.

Small populations of sparsely scattered individuals were found at the two sites in southern Nulato Hills, and in the Igichuk Hills north of the Seward Peninsula. Information is not available on population sizes at the other four known locations. No trend data are yet available. No known threats, although these populations are somewhat vulnerable due to small population sizes.

Ranking: ANHP – G5/S1S2.

***Ranunculus glacialis* ssp. *camissonis* (glacier buttercup).** This unique Alaska buttercup has pink to red petals instead of the usual yellow or white. A Beringian endemic, it is known from only a few highly disjunct localities in Alaska. On the Seward Peninsula it has been collected at Cape Mountain, Feather River, and the Bendeleben Mountains (UAF 2005b) (Map 3-8). The central Bendeleben Mountains collection site is at the Minnie Creek/Boston Creek mountain divide, with BLM-managed lands to the south and NPS lands (Bering Land Bridge

National Preserve) to the north. Outside the planning area, it was recently found (2001) on the north shore of Desperation Lake (Brooks Range) (Parker 2001a). It has also been documented in the Yukon-Tanana Uplands on Lime Peak and Mount Prindle (Parker et al. 2003). Moist to wet alpine meadow is the most common habitat type.

Information on population size, trend, and potential threats is mostly not available. However Parker et al. (2003) noted that only a few individuals were observed at each of the Yukon-Tanana Uplands sites on Lime Peak and Mount Prindle. Kelso (1989) listed this species as "common" in the 9.3 square mile area of Cape Prince of Wales/Cape Mountain inventoried, but described "common" as being seen in more than five sites in this area. No information was given on population numbers.

Ranking: ANHP – G4T3T4/S2.

***Rumex krausei* (Cape Krause sorrel).** This small Arctic sorrel (a member of the buckwheat family) is endemic to northwest Alaska and southeast Chuktoka Peninsula in Russia. All eight currently known locations in Alaska are within the planning area: Cape Dyer, Cape Thompson, Ogotoruk Creek, Mount Noak, Hugo Creek, and the North Fork of Squirrel River, plus Lost River (UAF 2004) and Sinuk River (Meyers 2005c) on the Seward Peninsula (Map 3-8). *Rumex krausei* is found at subalpine to alpine sites in wet meadows, on solifluction slopes, *Dryas* terraces, or wet seeps with rock and exposed mineral soil, often on calcareous soils and gravels.

The two Squirrel River populations on the North Fork (State-selected land) are quite small, one with approximately 13 individuals (Meyers 1994), and the other with 61 individuals (Meyers 1996b). The Sinuk River population is fairly large, consisting of at least several thousand individuals. The population was recently discovered on wet and sandy, calcareous outwash plains near the base of low mountains approximately five miles northwest of the lower Sinuk River on State- and Native-selected lands during a June 2005 rare plant survey conducted by the BLM, UAF Museum Herbarium, and ANHP (Meyers 2005c). Information on other population sizes, trend, and threats is not available.

Ranking: G2/S2; not on BLM-Alaska SSS plant list. However, it was shown on earlier drafts, and will be proposed for restoration to the list during annual review. The *Atlas of Rare Endemic Vascular Plants of the Arctic* places *Rumex krausei* in the IUCN category of Lower risk/Near threatened, for species that do not qualify for conservation dependent, but are close to qualifying for vulnerable (Talbot et al. 1999).

***Saussurea triangulata* (Waring Mountain sawwort).** Even though this purple-flowered member of the aster family does not occur on BLM-managed lands, it does occur within the planning area. It is included here due to its extreme rarity and the potential to turn up in similar habitat on BLM-managed land. In late June 2000 a field crew of botanists from the UAF Herbarium, BLM, and FWS discovered a small population of a puzzling *Saussurea* in the western Waring Mountains that turned out to be new to North America (Parker 2001b). During late June 2002 a second population was found, about four miles away from the original site (Parker 2004c). These populations occur in subalpine shrub meadow in an area of the Selawik National Wildlife Refuge (NWR) managed as wilderness (original population), and a little farther northeast across the crest of Waring Mountains into Kobuk Valley National Park (second population) (Map 3-8). Russian and American botanists believe this species is a distant disjunct from populations of *Saussurea triangulata* in the Russian Far East (but not on either Kamchatka or Chuktoka peninsulas) and in northern Korea (Parker 2003).

Both localities have small but healthy populations. Two hundred and fifty-two mature, flowering plants and numerous vegetative individuals were counted in an area approximately 35 by 55 feet in the Selawik NWR in August 2000 (Meyers 2000b). The second population was much smaller, less than a dozen stems, not yet flowering in late June 2002, in a single patch about 2.5 feet in diameter (Parker 2004c). Information on population trends and demographics is not known. There are no known threats.

Ranking: ANHP – G1/S1.

***Smelowskia johnsonii* (Johnson's smelowskia).** Only three collections have been made in Alaska of this densely white-hairy member of the mustard family. Over a span of 13 years (1959-72), it was collected at Flint Mountain in the Cape Thompson region, and Ukinyak Creek, Lisburne Hills on Cape Lisburne Peninsula of northwest Alaska, and near the coast at Lost River, on the western Seward Peninsula (Mulligan 2001, UAF 2004) (Map 3-8). This rare plant has not been documented on BLM lands. However, it is described here in recognition of its potential to occur on nearby BLM-managed lands in northwest Alaska. *Smelowskia johnsonii* was not recognized as a distinct taxon until validation as a new species in 2001 (Mulligan 2001).

*Smelowskia johnsonii* was reported as uncommon in occurrence on limestone talus slopes and ridges of Flint Mountain and surrounding hills in 1959 (Johnson et al. 1965). This species was treated as *S. borealis* var. *jordalii*. Viereck and Bucknell observed it in July 1960 to be scattered on steep limestone talus slopes above Ukinyak Creek, and identified it as *Smelowskia borealis* (UAF 2005b). No details are available concerning the July 1972 collection by Lenarz at Lost River except that it was growing in a *Dryas* fellfield. There are no known threats.

Ranking: ANHP – G1/S1.

***Trisetum sibiricum* ssp. *litorale* (Siberian oatgrass).** This rare grass is circumpolar Arctic in distribution, and has been found at three locations within the planning area: Ogotoruk Creek and Cape Thompson on the northwest Arctic coast, and at Teller, on the western Seward Peninsula (none of these are on BLM-managed land) (Map 3-8). It was first discovered in 1959 growing at Ogotoruk Creek, "…scattered in bare gravels, in mounds of earth surrounding ground squirrel burrows, in snow beds and on solifluction slopes" (Johnson et al. 1965). Additional localities within Alaska are the Kongakuk River (Arctic NWR), Mount Schwatka and Lime Peak (White Mountain NRA), and southeastern interior Alaska (Parker et al. 2003). This species is widespread in Arctic Russia (Tolmachev and Packer 1995).

No population figures are available; however, Johnson et al. (1965) reported *Trisetum sibiricum* as scattered in occurrence at Ogotoruk Creek, typically found in a variety of habitats but never very abundant. Parker et al. (2003) documented *T. sibiricum* ssp. *litorale* as rare in occurrence along a small drainage below Mount Schwatka in disturbed, moist shrub heath. There are no known threats.

Ranking: ANHP – G5T4Q/S2.

## d) Noxious and Invasive Plant Management

The BLM's noxious and invasive plant management program is based upon *Partners Against Weeds: An Action Plan for the Bureau of Land Management* (BLM 1996), the BLM's strategy to prevent and control the spread of noxious weeds on BLM lands through cooperation with all partners. The goals of this plan include generation of internal and external support for noxious weed control, development of baseline data on the distribution of weeds, provisions for noxious weed management in all BLM-funded or authorized actions, and implementation of on-the-ground operations. BLM management actions are generally tiered to State noxious plant laws and regulations. The State provides statutory support for management activities through Alaska Statute (AS) 03.05.010 and AS 44.37, which authorize the ADNR, Division of Agriculture, to prevent the importation and spread of pests that are injurious to public interest and for the protection of the agricultural industry. Statutory support is expanded in Alaska Administrative Code (AAC) Title 11 Chapter 34 with regulations for noxious weed control and rules for the establishment of quarantines, inspections, noxious weed lists, and control measures. However, funding has not been provided to allow for implementation of these legislative actions in Alaska.

The terms "non-native," "exotic," "weed," "noxious," and "invasive" can be defined in numerous ways. The terms "non-native" and "exotic" are used interchangeably and refer to a species of foreign origin. A "weed" is generally defined as a plant growing wild in a location where it is undesirable. Most weeds are non-native, but not all are noxious or invasive. "Noxious" is a legal classification rather than an ecological term. Government agencies may designate a species as "noxious" if it directly or indirectly imposes economic or ecological effects to agriculture, navigation, fish and wildlife, wildlands, or public health. Federal laws require that certain actions be taken to manage listed, noxious species. A species may be designated as noxious in one state but not another. Some species are more invasive than others. The invasiveness of a species is determined by its genetic makeup, which enables it to exploit a habitat "niche," and its lack of natural enemies such as insects, diseases, and/or pathogens. Species meeting these criteria are often referred to as invasive, and may or may not also be classified as noxious.

There are several lists of noxious plant species applicable to Alaska including the list in the AAC, the Federal Noxious Weed List, the Committee for Noxious and Invasive Plant Management Draft Worst Weeds List, and a list for Alaska's Weed Free Forage and Mulch Certification program. These lists have varying objectives, were developed over a wide time frame, and vary in the specific plants they include. The list of prohibited and restricted species found in 11 AAC 34.020 was developed to limit the amount of weed seed found in commercial seed products. Its focus was on agriculture, and it was developed more than 15 years ago. This list has not been updated to reflect current concerns about noxious and invasive plant species and their effects on natural ecosystems. The Federal Noxious Weed List was developed by the USDA Animal and Plant Health Inspection Service, and its primary focus is to prevent the importation of additional invasive species (7 CFR 360). Plants on the Federal list must meet its definition of quarantine pest: "A pest of potential economic importance to the area endangered thereby and not yet present there or present but not widely distributed and being officially controlled." Due to this strict requirement, the Federal list does not include the species that are already commonly found in Alaska.

The Alaska Exotic Plants Information Clearinghouse is a statewide database first developed in 2002. It is a collaborative effort between the BLM, USDA Forest Service, NPS, USGS, and UAF Cooperative Extension Service to develop regional information on the distribution and

abundance of non-native plant species in Alaska. A list of non-native species known to occur in Alaska can be generated from the database (BLM 2004d), but this list is not inclusive as it is limited by the data that has been entered into the database and the limited amount of inventory completed in the state.

The BLM is a signatory to the Memorandum of Understanding for the Establishment, Endorsement, and Support of the Alaska Committee for the Management of Noxious and Invasive Plants (CNIPM 2001). The purpose of this committee is to work for the statewide management of noxious and invasive plant species in Alaska. The signatories work together within the scope of their respective authorities to achieve sustainable, healthy ecosystems that meet the needs of society. CNIPM has developed a Strategic Plan for Managing Noxious and Invasive Plants in Alaska (CNIPM 2001). The BLM participated in development of the plan and has been implementing actions from this strategic plan in parts of the Fairbanks District. One action identified in the plan is the development of a statewide list of noxious and invasive plant species.

There are numerous exotic (non-native) plant species that occur within the planning area but the extent of their occurrence on BLM-managed lands is unknown as no formal inventories have been conducted. Lack of inventory is primarily due to lack of funding and personnel and the low priority assigned to inventory in the planning area relative to other BLM lands in Alaska. The BLM has been conducting noxious and invasive plant inventory in Alaska for the past four to five years. To date, inventories have focused on areas near major population centers, along the road system, and in conservation areas. A very limited inventory was done in Bering Land Bridge National Preserve and Cape Krusenstern National Monument, but no non-native species were found (McKee 2004). Since many of these non-native plant species have been present in Alaska for decades, a list of probable species within the planning area can be generated by referring to *Flora of Alaska and Neighboring Territories: A Manual of the Vascular Plants* (Hulten 1968). Species that are known to occur within the planning area are shown in Table 3-4.

It appears that most of these non-native species occur in disturbed areas such as roadsides and communities. Cold tundra soils and a thick vegetative mat make most of the planning area inhospitable to non-native species. The greatest threat for invasion or establishment of these species occurs with surface disturbing activities, particularly areas subject to repeated disturbance (Densmore et al. 2001). Gravel or fill dirt may be contaminated with seeds and seeds may be transported into uncontaminated areas on vehicles, construction, or mining equipment. Raised roadbeds, gravel pads, or the removal of the vegetative mat create a more hospitable environment for non-native plants to become established due to warmer soil, increased availability of light, and decreased competition from other plants. Most of the non-native plants documented in the planning area thus far (Table 3-4) are common in Alaska, occur only in disturbed areas, and are not highly invasive into undisturbed habitats. Most of these species have come from Europe or Asia, and were usually imported either intentionally for their perceived value to humans, or inadvertently as contaminants in other products.

**Table 3-4. Non-native Plant Species Known to Occur in the Planning Area**

| Scientific Name | Common Name | Known Locations |
|---|---|---|
| *Bromus hordeaceus* | Downy brome | Nome |
| *Bromus inermis* | Smooth brome | Nome |
| *Bromus tectorum* | Cheat grass | Nome |
| *Capsella bursa-pastoris* | Shepherd's purse | Kotzebue |
| *Chenopodium album* | Lambsquarters | Kobuk River delta |
| *Crepis tectorum* | Narrowleaf hawksbeard | Kotzebue |
| *Deschampsia elongata* | Slender hairgrass | Nome |
| *Hordeum jubatum* | Foxtail barley | Kotzebue, Nome |
| *Lolium multiflorum* | Italian ryegrass | Kotzebue, Nome |
| *Lolium perenne* | Perennial ryegrass | St. Michael |
| *Matricaria matricarioides* | Pineapple plant | Kotzebue, Nome |
| *Medicago lupulina* | Black medic | Nome |
| *Phleum pratense* | Timothy | Nome |
| *Poa compressa* | Canada bluegrass | Nome |
| *Poa pratensis* | Bluegrass | Pt. Hope |
| *Senicio vulgaris* | Common groundsel | Nome |
| *Stellaria media* | Common chickweed | Kotzebue, Nome |
| *Taraxacum sp.* | Dandelion | Kotzebue |
| *Thlapsi arvense* | Field pennycress | Kotzebue |
| *Trifolium repens* | White clover | Nome |
| *Tripleurospermum phaeocephalum* | Wild chamomile | Kotzebue, Bering Land Bridge National Preserve, Seward Peninsula |

Source: Hulten 1968, Meyers 2001, Meyers 2004a, Meyers 2005a, Meyers 2005b, and Meyers 2005d.

INSERT 11x17 MAP
**3_6_veg_cover**

INSERT 11x17 MAP
**3_7_veg_wach_fire**

INSERT 11x17 MAP
**3_8_veg_plants**

# 6. Fish and Wildlife

## a) Fish

### (1) Fish Species Present in Planning Area

The freshwater streams and lakes within the planning area contain all five species of Pacific salmon present in Alaska: Chinook or king (*Oncorhynchus tshawytscha*), sockeye or red (*O. nerka*), coho or silver (*O. kisutch*), chum or dog (*O. keta*), and pink or humpback (*O. gorbuscha*). Other important fish utilized for subsistence or commercial harvest are Dolly Varden (*Salvelinus malma*), Arctic char (*S. alpinus*), sheefish or iconnu (*Stenodus leucichthys*), burbot (*Lota lota*), round whitefish (*Prosopium cylindraceum*), humpback whitefish (*Coregonus pidschian*), and Bering (*C. laurettae*), least (*C. sardinella*), and possibly Arctic (*C. autumnalis*) ciscoes. Northern pike (*Esox licious*) and Arctic grayling (*Thymallus articus*) are popular sportfish. Other resident fish found in the planning area but incidental economically include nine-spined stickleback (*Pungitius pungitius*), slimey sculpin (*Cotus cognatus*), long-nosed sucker (*Catostomas catostomas*), and Alaska blackfish (*Dallia pectoralis*).

### (2) Fish Habitat Description

The topography of the planning area is characterized by relatively narrow coastal plains with extensive upland areas to 5,000 feet. The north side of the Kuzitrin River Basin essentially forms the boundary between the Chukchi Sea drainage to the north (Kotzebue Sound) and the Bering Sea drainage to the south (Norton Sound). The vegetative communities are dominated by tundra, with taiga communities (composed mainly of white and black spruce) occurring in the Nulato Hills and the southeastern Seward Peninsula east of Golovin Bay. Riparian species vary from low willow to white spruce forests dependant on general location and site-specific microhabitat conditions.

The planning area contains numerous anadromous fish streams listed in the Anadromous Stream Catalog (ADF&G 1997) as shown in Map 3-9. Most BLM-managed lands in the planning area are undisturbed and are located in upper river drainages. Public lands in the planning area provide important spawning, rearing, and overwintering habitat for resident and anadromous fish. These streams provide adequate spawning substrate, stream flows, deep pools, and thermal regimes to support healthy fish populations. Commercial, subsistence, and sport fisheries intercept fish that are bound for BLM-managed lands. Although estimates have not been made for Kotzebue Sound and the Imuruk Basin, the BLM's Norton Sound Aquatic Habitat Management Plan (BLM 1988a) estimated that 70 percent of the fish caught in Norton Sound were spawned on BLM-managed lands.

In Kotzebue Sound, the Squirrel and Kivalina rivers are the major drainages comprised of significant amounts of public land. Both chum and pink salmon are found in the Squirrel River. Chum salmon are the most numerous and the most important economically because they contribute to subsistence fishing that occurs in the Kobuk and Squirrel rivers (ADF&G 2003) and to the commercial fishery in Kotzebue Sound (Lean et al. 1993). A commercial chum fishery existed in 2004 and 2005 as a result of efforts by the Kotzebue Sound Fisheries Association, who purchased 51,000 and 73,000 fish in those respective years. Field information indicates

that known chum salmon spawning areas are located along much of the main river. Major spawning areas have been identified along the main stem between Timber and Klery creeks above the Omar River, and on the lower portion of the North Fork of the Squirrel River (ADF&G 1997). Anecdotal information indicates that the chum salmon tend to spawn in spring-fed sloughs which turn green with algae due to the influx of nutrients from the salmon carcasses (Lean 2003). During annual aerial monitoring surveys, ADF&G observers have noted a few hundred pink salmon spawning in the main river below the mouth of the Omar River. In addition, large schools of whitefish have been observed in the calm, deep-water pools of the Omar, and northern pike have been found as far upriver as the mouth of the Omar River (Lean and Hartle 1989).

The Kivalina River provides important spawning and rearing habitat for world class Dolly Varden. Most of the spawning occurs at or just downstream of spring areas (Decicco 2005), as shown in Map 3-10. Springs located in the upper drainage may also provide spawning habitat, but they have not been inventoried due to budget constraints.

In Norton Sound, the Nulato Hills on the eastern side of the basin divide the Yukon River drainage from Norton Sound. Interspersed between the mountainous areas on the Seward Peninsula are several large marshy areas including the Koyuk River Basin, Death Valley in the Tubutulik River Basin, McCarthy's Marsh in the Fish River Basin, the Kuzitrin River lowlands, and the Imuruk Basin. These marshy areas act as important habitat for growth due to the increased water temperatures found in the low gradient portions of these drainages. Higher water temperatures increase growth rates in salmonids until water temperatures reach 50 °F, at which point the increased metabolic rate decreases growth rates (Martin 1985). These marsh areas provide a preferred microhabitat that enhances growth during the early summer.

The rivers, streams, lakes, and ponds of the planning area are important producers of fish for subsistence, commercial, and sport fisheries. Many of the streams that are important spawning and rearing habitat for anadromous fish occur on BLM-managed lands. The planning area has an estimated 10,000 miles of streams on BLM-managed lands alone, and there are thousands of acres of lakes of many types (e.g., thaw, oxbox, glacial) that support resident and anadromous species. Cursory surveys conducted by the BLM on some of the area streams and lakes since 1978 (Kretsinger 1987, Webb 1978a, 1978b, 1978c, 1979, 1980, 1985, 1986a, and 1986b) indicate most streams and lakes within the planning area are in pristine, untouched condition; however, many of these drainages have not been extensively inventoried for fishery values due to lack of funding. Other than aerial surveys to determine fish escapement conducted by ADF&G (Lean and Hartle 1989) and a handful of salmon counting camps that estimate the number of returning adult salmon to various streams in Norton Sound, little is known about exact species composition and habitat use. Cursory surveys have been conducted by the BLM on some of the area streams since 1978.

### *(3) Factors Affecting Fish Habitat and Production*

Although most of the fisheries habitat within the planning area exists in an undisturbed state, there are some areas that have been impacted by various developments. Road construction, gold mining, and gravel mining are activities that have negatively affected fisheries habitat in the past. Woodward-Clyde Consultants (1980) studied the effects of stream and riparian gravel mining on certain Seward Peninsula streams for the U.S. Fish and Wildlife Service. Introduction of sediment into streams from mining caused the greatest impacts on fish, with increased silt clogging spawning gravels and suffocating developing fish eggs. Road construction may also adversely affect fish by limiting upstream access to tributaries by rearing juvenile fish if culverts

are not properly engineered or installed (Woodward-Clyde Consultants 1980). These disturbances continue to various degrees, with gold mining activity possibly increasing with the rising price of gold, although very few Federal claims remain within the planning area. Some drainages, mostly on State land, including the Nome and Solomon rivers, have sustained fish habitat damage due to historic mining, while some gravel pits have been rehabilitated to provide rearing ponds, particularly for coho salmon in the Nome River drainage (Webb and McLean 1991).

Many factors influence the productivity of a resident fish population, including water temperature, streamflow, food availability, adequate spawning and rearing habitat, spawner-recruit ratio, and fishing pressure. Anadromous species complicate matters by introducing ocean conditions which may limit production as well: sea surface temperature; phytoplankton, zooplankton, and larval fish abundance; ocean currents; and marine survival. Inter- and intraspecies competition also play a role in determining how many fish a fishery or watershed produces. Fisheries habitat on BLM-managed lands in the planning area is mostly undisturbed and should not be limiting to the production of resident and anadromous fish.

INSERT 11x17 MAP
**3_9_fish_anad**

INSERT 8½x11 MAP
**3_10_fish_kivalina**

# b) Wildlife

Given the physiographical extent of the planning area, habitats are quite varied and support a diversity of wildlife. These habitats and the wildlife species that rely on them extend across administrative boundaries to other Federal, State, and private lands both within and outside the planning area. Public land ownership is scattered with intermingled private and State lands, though large blocks of public land are present in some areas. Habitats within the planning area have been subjected to limited disturbance in the past and are considered to be in a mostly natural and nearly pristine condition given the roadless nature of the area, difficulty in accessing the area, and the low number of permitted activities occurring on BLM-managed lands. The planning area includes the majority of Game Management Unit 22, all of Unit 23, and the far western portion of Unit 26A (Map 3-11).

Only those wildlife species considered important as a subsistence resource, economically important to the region, or otherwise requiring management emphasis will be addressed in this chapter.

## *(1) Muskoxen*

Muskoxen are indigenous to northwestern Alaska but disappeared before or during the nineteenth century. Muskoxen were reintroduced to northwestern Alaska in 1970 on both the Seward Peninsula and near Cape Thompson (Map 3-11). Since that time, the Seward Peninsula population has grown rapidly and extended its range to occupy suitable habitat throughout the peninsula. The Cape Thompson population has grown more slowly and occupies habitats within 15-20 miles of the Chukchi Sea coast (Dau 2003d).

The Seward Peninsula population is well established as far east as the Buckland River and Darby Mountains, and is currently expanding further east into the Nulato Hills and the Selawik and Yukon river drainages. Muskoxen have been found only once east of the Darby Mountains during the spring (March) census period (Persons 2003a). Much of this area is heavily forested and accumulates more snow than the open tundra areas further north and west, limiting suitable winter habitat. There have, however, been reports of muskoxen in the Koyuk River drainage, near Elim, and near Granite Mountain during the summer and one report of three muskoxen near Koyuk during the winter of 2002 (Persons 2003a). The 2005 population was estimated at 2,387 animals. Population density is highest on the western Seward Peninsula (Persons 2003a).

The Cape Thompson population ranges from the mouth of the Noatak River to Cape Lisburne within 15-20 miles of the Chukchi Sea (Dau 2003d). Coastal winds tend to diminish snow depths on exposed ridges during the winter and keep ambient temperatures lower during the summer. The quality and quantity of winter forage in this area is low and may have limited the growth rate of the population. The Cape Thompson population grew by an average of 8 percent per year from 1970 to 2000 compared to a 14 percent per year growth rate in the Seward Peninsula population during the same time frame. In 2000, the Cape Thompson population was estimated to be 424 animals (Dau 2003d).

In addition to these two relatively discrete populations, widely scattered muskoxen occur in groups of one to four individuals throughout most of Unit 23. Small, widely scattered groups can be found throughout the Noatak and Kobuk river drainages almost to Walker Lake, and in the

Selawik River drainage including the middle Tagagawik River (Dau 2003d). Most of these animals are bulls, but mixed sex groups have recently been observed in the Selawik River drainage (Dau 2003d).

Favored habitat includes wind blown ridges during the winter and riparian areas during the summer. When snow depth is greater than 12 inches, muskoxen move to areas where snow cover is minimal such as exposed ridges. Vegetation in these areas is typically sparse. During the winter muskoxen survive on body-fat reserves and minimize movement to conserve energy. In the summer forage is plentiful and muskoxen build fat reserves.

Recommendations from the Seward Peninsula Muskox Cooperators Group guide management of muskoxen on the Seward Peninsula. ADF&G management goals and objectives for muskoxen in Units 22 and 23 include the following (Persons 2003a):

- Allow for continued growth and range expansion of muskoxen into historic habitats,
- Provide for a limited harvest on a sustained yield basis, consistent with existing State and Federal laws.
- Provide for non-consumptive uses, particularly along the Nome road system.
- Work with local reindeer herding interests to minimize conflicts between reindeer and muskoxen.
- Protect and maintain the habitats and other components of the ecosystem upon which muskoxen depend.
- Encourage cooperation and sharing of information among agencies and users of the resource in developing and executing management and research programs.
- Census populations at two to three year intervals to document changes in population and distribution.
- Cooperatively manage State and Federal hunts.

### *(2) Moose*

Moose are an important subsistence resource and are widely distributed throughout the planning area in suitable habitats. They are not found in areas of extreme habitat such as unvegetated mountains, deep lakes, or marine environments. Moose are most abundant in areas that contain willow and birch shrubs, and along large rivers. In general, their distribution is determined by requirements for food and cover and by seasonal snow depths.

Moose were first documented in the eastern part of the planning area in the 1920s. By the 1960s they occupied most areas of suitable habitat within the planning area. Moose habitat is found in Units 22, 23, and 26A (Map 3-11). Populations grew rapidly in Units 22 and 23, eventually peaking in the 1980s. Between 1988 and 1992 moose populations in these areas stabilized or began to decline (Dau 2004a, Persons 2004). Moose have been well established in Unit 26A since about 1940 (Carroll 2004a). Currently, moose populations are low or declining in Units 22A, 22B, 22D, and possibly 22E. Populations in Units 22A, 22B, and 22D have declined by as much as 50 percent since the late 1980s. A census of the Unalakleet drainage (Unit 22A) resulted in a population estimate of only 75 moose, a significant decline from a previous census of 325 moose in 1989. Other surveys indicate either very low recruitment rates or low population levels in other parts of the unit, indicating that the population is well below ADF&G's management goal of 600-800 moose in Unit 22A. Moose populations in Units 22B and 22D have declined since the late 1980s and are well below ADF&G's population management goals of 1,000-1,200 moose and 2,000-2,500 moose, respectively. Moose populations in western Unit 22B declined by about 50 percent from an estimated 1,894 moose

in 1987 to 797 moose in 1999. Although no census data exists for eastern Unit 22B, recruitment surveys in this area indicate low recruitment rates. A 2002 census in Unit 22D resulted in an estimate of 1,594 moose, a decline of 45 percent since the population was first censused in 1988 and a 13 percent decline since 1997. In Unit 22C, the moose population has grown steadily over the past decade and was estimated at 557 moose in 2001. This is well above the population management goal of 450-475 moose, and there is concern that the population may exceed the carrying capacity of the winter range. The first stratified census of Unit 22E was completed in 2003 and the population estimate of 504 moose was higher than expected. This may have been the result of unusually sparse snow cover that allowed the moose to remain on their summer range rather than an actual increase in population level (Persons 2004). Before the 2003 census, available data indicated that the moose population in the unit was declining and management changes had been implemented to reduce harvest (Persons 2002).

Observations by the public and ADF&G staff indicate that moose populations are declining throughout Unit 23. This decline appears to be the most pronounced in the Noatak drainage and on the Seward Peninsula (Dau 2002a). Populations may be stable in the Selawik drainage (Dau 2004a). Interpreting moose data in Unit 23 is difficult due to changes in census area boundaries, the small size of the census areas, and the limited number of censuses that have been completed. To counter these problems, ADF&G substantially increased the size of census areas in Unit 23 beginning in 2001 (Dau 2004a).

A few moose probably occur in the extreme northern part of the planning area during the summer but not in significant numbers. In Unit 26A moose are primarily found in the Colville River drainage, which is outside of the planning area. The Colville River population was stable and slowly increasing from 1970 to 1991, with populations ranging from 1,219-1,535 moose. A 1995 census indicated a 51 percent population decline between 1991 and 1995. Trend counts indicate that the population has been increasing since 1996. The most recent population estimate was 576 moose in 2002 (Carroll 2004a).

Moose winter habitat condition in the planning area is not known to be a limiting factor to moose populations. However, monitoring of browse has been very limited. Moose habitat quality limits distribution and numbers of moose within the planning area. Some parts of the planning area are marginal moose habitat and will never support high numbers of moose. Fire is a natural feature of the landscape within the planning area. It has not been suppressed to the extent that substantial changes in habitat quality have occurred.

### *(3) Caribou*

The Western Arctic Caribou Herd (WACH) ranges throughout the planning area, calving in the National Petroleum Reserve-Alaska (NPR-A) just east of the northern portion of the planning area, and wintering in the Nulato Hills and eastern Seward Peninsula on the south. This herd ranges over about 140,000 square miles in northwestern Alaska (Map 3-12). Within the planning area, approximately 46 percent of the total WACH range, 61 percent of the insect relief area, 69 percent of the calving grounds, and 54 percent of the winter range is on BLM-managed land.

In the early 1970s, the WACH population was estimated at 243,000 animals. By 1976, the population had declined to an estimated 75,000 animals. From 1976 to the present, the herd has grown substantially. Census data from 1996 and 1999 resulted in population estimates of

463,000 and 430,000 caribou, respectively (Dau 2003b). A census completed in 2003 resulted in the current estimated population size of 490,000 caribou (Dau in prep).

Animals from the Teshekpuk Lake Caribou Herd (TLH) may also be found witin the planning area. The primary range of the TLH is the North Slope west of the Colville and Itkillik rivers, with the peripheral range sometimes extending as far south as the Nulato Hills of the Brooks Range and as far east as the Arctic National Wildlife Refuge. Most of the herd's range, including the calving range is in the northern portion of the NPR-A. The TLH caribou winter in various locations from near Teshekpuk Lake to the Chukchi Sea coast to south of the Brooks Range. The most common wintering area is around Atqasuk (Carroll 2003c). In some years, TLH caribou may winter within the planning area. For example, In 1996-1997 most of the herd wintered south of the Brooks Range, between Cape Lisburne and the Seward Peninsula (Carroll 2003c).

In 1984, the first photocensus of the TLH counted 11,822 caribou (Carroll 2003c). Other photocensus estimates in 1985 (13,406 caribou), 1989 (16,649 caribou), and 1993 (27,686 caribou) documented a steady increase in the TLH. This was followed by a decrease in the herd estimate in 1995 (25,076 caribou). The estimate again increased in 1999 (28,627 caribou) and in 2002 (45,166 caribou). It is most likely that the 1999 photocensus and possibly the 1995 census undercounted the population, and the herd has gradually increased through the 1990s (Carroll 2003c).

Caribou migrate seasonally between their calving areas and summer and winter ranges to take advantage of seasonally available forage. In general, the winter diet of caribou consists predominantly of lichens, with a shift to vascular plants during the spring (Thompson and McCourt 1981). Composition of plant fragments in caribou fecal pellets collected in the winter range of the WACH averaged 83 percent lichen (Jandt et al. 2003). *Eriophorum* buds (tussock cottongrass) appear to be very important in the diet of lactating caribou cows during the calving season (Thompson and McCourt 1981, Eastland et al. 1989), while orthophyll shrubs (especially willows) are the predominant forage during the post-calving period (Thompson and McCourt 1981).

Calving ground locations may shift gradually over years or change abruptly due to environmental conditions. Since the mid-1970s, the WACH has calved primary in the Utukok Hills, north and east of the planning area (Dau 2003b). Since the late 1980s calving has been more dispersed and not confined to the Utukok Hills (Dau 1999). Typically, most pregnant cows reach the calving grounds by late May. Severe weather and deep snow can delay spring migration, with some caribou calving en route. Unusual distribution of WACH caribou cows in 2000 and 2001 due to a late break-up (Dau 2003b) illustrates the importance of maintaining free access to calving grounds and providing an adequate buffer around traditional calving areas for years when unusual environmental conditions delay migration.

Insect-relief areas become important during the late June to mid-August insect season. Insect harassment reduces foraging efficiency and increases physiological stress. Caribou use various coastal and upland habitats for relief from insects, including sandbars, spits, river deltas, some barrier islands, mountain foothills, snow patches, and sand dunes; in general, areas where stiff breezes prevent insects from concentrating. Dau (2003b) provides a description of the general movements of the WACH after calving. By mid-June cow/calf groups move west from the calving grounds toward the Lisburne Hills. In late June when the mosquitoes begin to emerge, bulls and nonmaternal cows move to the western North Slope and De Long Mountains. In early July, oestrid flies emerge and insect harassment intensifies, causing WACH caribou to

form large aggregations that may include more than 100,000 individuals. At this time, WACH animals begin to move eastward through the Brooks Range toward Anaktuvuk and Howard passes. As insects diminish in early to mid-August, the caribou disperse. Some move onto the North Slope, going as far as Cape Lisburne and Barrow, while others remain in the mountains.

The fall migration begins in mid-August and extends until mid- to late November. At this time, migratory movements cease and the animals become relatively sedentary until spring migration. Radio telemetry data indicates that the vast majority of the WACH uses the western North Slope and Brooks Range during the summer. In recent years, several thousand caribou (primarily bulls and immature cows) have summered on the Seward Peninsula (Dau 2003b).

The winter range of the WACH has changed over time and varies from year to year. The area identified on Map 3-12 represents areas where most of the herd has wintered in most years since the mid-1980s. Before the mid-1970s a substantial portion of the WACH wintered north of the Brooks Range or near Wiseman and Anaktuvuk Pass. Since the mid-1970s the primary winter range of the WACH has been south of the Brooks Range along the northern fringe of the boreal forest. While most of the herd migrates south of the Brooks Range, some caribou winter on the Arctic coastal plain most years (Dau 2003b, BLM 2003b).

Using radio-collar locations, Dau (2003b) has described the recent winter distribution of the herd in more detail. Between the mid-1980s and mid-1990s a large portion of the WACH consistently wintered in the Nulato Hills. In the last decade, the WACH began shifting its winter range west from the Nulato Hills to the Seward Peninsula. Before the 1996-97 season, less than 9 percent of the herd wintered on the peninsula in any given year. However, in that 1996-97 season, more than 50 percent of the herd wintered on the peninsula. The WACH has also become more dispersed during the winter in recent years. Prior to 1996 more than 50 percent of the herd generally wintered in a single geographic area, usually the Nulato Hills. Since that time, however, the herd has wintered in three to four geographic areas each year, none of which are used by more than 50 percent of the herd. Wintering areas identified by Dau (2003b) include: North Slope west of the Colville River; foothills of the Brooks Range west of the Utukok River; foothills of the Brooks Range east of the Colville River; Kobuk drainage below Selby River, lower Squirrel drainage, Selawik drainage, and Buckland drainage; Kobuk drainage above Selby River including the central Brooks Range and the Noatak drainage north of Douglas Creek; Koyukuk drainage south of the Brooks Range; Seward Peninsula; Nulato Hills; and Noatak drainage south of Douglas Creek, upper Squirrel drainage, Wulik and Kivalina drainages, and Lisburne Hills.

The current quality of caribou habitat within the planning area is mostly unknown, with the exception of the Buckland River Valley and the northern Nulato Hills, where the BLM has been monitoring caribou winter range since 1981. The last time these habitat transects were monitored, they showed a 14 percent decline in the percent cover of lichen (Jandt et al. 2003). However, this apparent decline is based on only 20 transects within the 140,000 square mile range of the herd (for more information on vegetative cover in these areas, see the discussion on lichen communities beginning on page 3-31 in the Vegetation section). Given the remoteness of the area and lack of development and other resource uses within the range of the herd, habitat is thought to be in a natural condition in most areas. The large size of the WACH has reduced the availability of lichen in some areas. On the Seward Peninsula, lichen cover has decreased in some localized areas due to grazing by domestic reindeer. Most of the reindeer allotments within the heavily used caribou areas on the eastern Seward Peninsula (Buckland River, Baldwin Peninsula, Shaktoolik, Koyuk River, and McCarthy's Marsh) have been mostly ungrazed by reindeer since the mid- to late1990s. Although there may have been

small numbers of stray reindeer remaining at this time, they were scattered and most of the herders were not actively managing their animals. In 1982, the Buckland River allotment boundary was adjusted to exclude grazing from the eastern half of the allotment (BLM 1992). The last reported gather for this allotment was in 1994 when 61 reindeer were gathered (Kawerak Inc. 2005). In 2001, the permittee for the Baldwin Peninsula Allotment reported that he no longer had any reindeer on public land (BLM 2001b). The McCarthy's Marsh allotment has not been permitted for livestock grazing since 1984 (BLM 2003a). In 2001, the permittee for the Koyuk River Allotment stated that he had no reindeer remaining (BLM 2002b). In 1994, there were about 1,400 reindeer remaining on the Shaktoolik River allotment. Since that time, most if not all have emigrated with migrating caribou (BLM 2002a).

Dau (2003) identified the portion of the De Long Mountains and its northern foothills west of and including the upper Utukok and Kugururok drainages as critical insect relief habitat for the WACH. During the first half of July, the WACH forms huge aggregations near the Chukchi Sea coast and on barren ridgetops in the westernmost portion of its summer range. During this time, virtually the entire herd moves from the Lisburne Hills/Cape Thompson area eastward toward Howard Pass. Any development that would affect WACH movements at this time of year would essentially impact the entire herd.

The following management objectives for the WACH are identified in the Western Arctic Caribou Herd Cooperative Management Plan (Western Arctic Caribou Herd Working Group 2003):

- Encourage cooperative management of the herd and its habitats among State, Federal, and local entities and all users of the herd.
- Recognizing that caribou herds naturally fluctuate in numbers, manage for a healthy population using strategies adapted to population levels and trends.
- Assess and protect important habitats of the WACH.
- Promote consistent, understandable, and effective State and Federal regulations for the conservation of the WACH.
- Seek to minimize conflict between reindeer herders and the WACH.
- Integrate scientific information, traditional ecological knowledge of Alaska Native users, and knowledge of all users into management of the WACH.
- Increase understanding and appreciation of the WACH through use of scientific information, traditional ecological knowledge of Alaska users, and knowledge of other users.

### *(4) Dall Sheep*

Within the planning area, Dall sheep populations are found at low densities in the Baird Mountains, Wulik Peaks, and De Long Mountains (western Brooks Range) in Units 23 and 26A. Sheep in this area are at the northwestern margin of their range in Alaska and may be more prone to population changes due to adverse weather than in other parts of the state (Dau 2002b). Although all three sheep populations are found within the planning area boundary, only a small portion of the Baird Mountains population occurs on BLM-managed lands. The current condition of Dall sheep habitat in the Baird Mountains has not been quantified. The remote nature of the area, inaccessibility of the habitat, and limited number of commercial or permitted activities in the area make it very likely that the habitat is in a natural condition. The majority of the high quality habitat is located on NPS land. As the NPS has a greater ability to regulate public and commercial uses, the habitat is expected to remain in a mostly natural condition (Shults 2004, NPS 2005) (Map 3-11).

Small groups of sheep regularly occur on BLM-managed land in the Squirrel River drainage (Baird Mountains). Robinson (1987) estimated that 371,000 acres of BLM land in this area was suitable sheep habitat. Singer and Johnson (1984) speculated that sheep found along the crest of the Baird Mountains (the boundary between BLM and NPS lands) might be transient animals that disperse from higher density areas to the north.

According to Dau (2002b), the Baird Mountain sheep population last peaked in 1989 when there were an estimated 981 sheep. Severe winters resulted in a population decline, and the population reached its lowest level in 1996 at about 33 percent of the 1989 level. Lamb production was relatively low until 1995, at which time production increased to pre-1991 levels leading to a corresponding increase in population. The population in 2001 was estimated at 616 sheep (Dau 2002b).

Noatak National Preserve, an NPS unit, is currently developing management objectives for sheep in the Baird Mountains. The focus of these management objectives would be to limit harvest to a conservative level and base harvest on a running average of population size in order to avoid annual reevaluations of harvest (Shults 2004).

### *(5) Brown Bear*

Brown bears are widely distributed within the planning area. When not hibernating, they occupy all available habitats within their home range to take advantage of seasonably available food sources. Population densities vary depending on the productivity of the environment. Because brown bears range over large areas with no affinity to a particular habitat, they should be considered creatures of the landscape rather than of a specific habitat type.

Another aspect of bear habitat is the availability of prey species. Declining moose and fish stocks in the planning area may adversely affect bear populations. The current condition of brown bear habitat in the planning area has not been quantified. For the most part, the habitat is in a natural condition. Most of the BLM-managed lands in the planning area are roadless and are far from villages. BLM has not permitted many activities within the planning area that would have resulted in surface disturbance or changes to the habitat. No threats to the quality of habitat are known.

Habitat suitability varies within the planning area, though bear densities are generally higher on the southern Seward Peninsula than in other areas. A census completed in the early 1990s resulted in a density estimate for Units 22C, 22D, 22E and eastern 22B at one bear per 27 square miles (Persons 2003b). This estimate varied greatly within the study area, with the highest density of bears found in western Unit 22B (one bear per 20 square miles) and the lowest in Unit 22E (one bear per 39 square miles). According to ADF&G, bear densities in Unit 22 have increased since 1991 and are currently higher than the densities found during the study (Persons 2003b). The only brown bear census in Unit 23 occurred in 1987 near the Red Dog Mine Road. This study resulted in a density estimate of one adult bear per 27.5 square miles (Ballard et al. 1991). There is no other quantitative data to estimate population trend. Residents of Unit 23 believe that brown bear populations have increased since the 1940s and 1950s (Dau 2003a). Beginning in 2002, ADF&G has received some reports from guides and local residents that bear numbers are decreasing in the Noatak drainage (Dau 2003a). In 1998, bear densities were estimated for broad habitat zones in Unit 26A using subjective comparisons to areas of the North Slope with known bear densities. Densities were estimated at 0.5-2 bears per 386 square miles on the coastal plain (<800 feet elevation), 10-30 bears per 386 square miles in the foothills, and 10-20 bears per 386 square miles in the mountains (Carroll 2003a).

ADF&G has established the following management goals for brown bears in Units 22, 23, and 26A (Dau 2003a, Persons 2003b, Carroll 2003a):

- Maintain the population at levels estimated during the 1991 census in Unit 22.
- Maintain a population that sustains a three-year mean annual reported harvest of at least 50 percent males.
- Maintain a minimum density of one adult bear per 25.7 square miles in the Noatak drainage (Unit 23).
- Maintain the existing brown bear population in Unit 26A (approximately 800 bears).

### *(6) Black Bear*

In Alaska, black bears occur over most of the forested areas of the state. They are not found on the western Seward Peninsula or north of the Brooks Range (ADF&G 1994a). Similar to brown bears, biological pressures dictate what areas of the black bears home range are preferred at different times of the year. When not hibernating, black bears occupy all available habitats within their home range, taking advantage of seasonably available food sources.

The current condition of black bear habitat in the planning area has not been quantified. For the most part, the habitat is in a natural condition. The portion of the planning area that supports black bears is roadless and remote from most communities. There have been few permitted activities in the area other than special recreation use permits for guided hunting. No threats to the quality of habitat are known. Habitat suitability varies within the planning area, with black bears found primarily in the forested areas in the eastern portion of the planning area. No density estimates are available for black bear populations as there are not enough bears in the area to warrant monitoring by ADF&G. Community harvest assessments show that black bears are harvested in low numbers by residents of Noorvik, Kiana, Selawik, and Shungnak, indicating that they are found as far west as the traditional hunting areas for these communities. The percentage of households in these communities attempting to harvest black bears between 1998 and 2003 ranged from 4 to 20 percent. Noorvik reported the highest harvest level at 14 black bears in 2002 (Georgette et al. 2004).

### *(7) Gray Wolf*

In general, wolves are found throughout the planning area wherever adequate numbers of prey species are found. In most of Alaska, moose and/or caribou are their primary food. During summer, small mammals including voles, lemmings, ground squirrels, snowshoe hares, beavers, and occasionally birds and fish supplement their diet (ADF&G 1994b).

Wolf numbers in the planning area have fluctuated over the past century based on availability of prey species, government-sponsored wolf control programs, and hunting regulations. Wolf numbers generally increased after Federal wolf control programs were discontinued in the 1960s, aerial wolf hunting was banned in 1970, and land-and-shoot aircraft hunting was banned in 1982 (Carroll 2003b, Dau 2003c, Gorn 2003).

Research has never been conducted in Unit 22 to assess wolf distribution and population trend. Estimates of wolf distribution, population trend, harvest, and human use data are obtained from sealing certificates and observations by staff, reindeer herders, and other local residents (Gorn 2003). In 1990, Ballard (1993) estimated a density of one wolf per 50 square miles in the middle Kobuk River. Extrapolating this density to all of Unit 23 results in a very rough

population estimate of 869 wolves (Dau 2003c). Wolf abundance in the Nulato Hills and Seward Peninsula is dependant upon the presence of caribou, with abundance increasing from October to May when caribou are present. As caribou have extended their winter range west, wolf numbers have also increased (Gorn 2003). Reports from local residents, statewide trapper surveys, and observations by ADF&G staff indicate that wolf numbers have increased on the Seward Peninsula west of and including the Buckland River drainage (Gorn 2003, Dau 2003c). Wolf numbers also appear to have increased in the Kobuk River drainage and decreased slightly in the Noatak River drainage (Dau 2003c). Within Unit 26A, most wolves are found in the Brooks Range and foothills and in the Colville River drainage (Carroll 2003b). In 1993, an estimated 240-390 wolves in 32-53 packs were resident in Unit 26A (Carroll 2003b).

ADF&G has the following management goals for wolves in Units 22, 23, and 26A (Carroll 2003b, Gorn 2003, Dau 2003c):

- Maintain viable wolf populations in Units 22, 23, and 26A.
- Provide hunting and viewing opportunities in Unit 23.
- Minimize adverse interactions between wolves and the public.
- Involve the public in development of a wolf management plan in Unit 26A.

### *(8) Furbearers*

Furbearers include those species of mammals that are routinely sought after by licensed trappers who place commercial value on the animals' pelts. Furbearers found in the planning unit include beaver, red fox, Arctic fox, lynx, marten, mink, muskrat, river otter, coyote, wolverine, and wolf (for more information on wolves, see the Gray Wolf section above beginning on page 3-61). Most furbearer harvest in the planning area is by subsistence and recreational users, or is done opportunistically by local residents while engaged in other activities. There are few professional trappers operating in the planning area (Gorn 2004, Dau 2004b, Carroll 2004b). Definitive species population and distribution information is not available, and consequently, ADF&G wildlife biologists rely upon annual trapper harvest reports and opinions, information from local residents, and field observations by ADF&G personnel to gauge furbearer status and trend information. The price paid for animal pelts is the greatest determining factor in trapper harvest effort, and subsequently, in the number of pelts sealed per species per year by ADF&G (Carroll 2004b, Dau 2004b, Gorn 2004).

Wolverines are reported to be common throughout Unit 22 and their numbers are stable. The reported harvest of 71 wolverines from Unit 22 in 2000-01 is the highest ever reported for the unit (Gorn 2004). Based on observations by local residents and ADF&G staff, wolverine numbers appear to be stable in Unit 23. Most of the harvest occurs within 50 miles of communities and therefore, wolverines are most abundant in remote portions of the unit (Dau 2004b). Community harvest assessments show that almost all of the surveyed communities within the planning area harvest some wolverines (Georgette et al. 2004). Hunters have reported that wolverines seem more abundant in recent years in Unit 26A; however, there have been no recent population surveys. In 1984 density was estimated at one wolverine per 54 square miles throughout Unit 26A (Carroll 2004b).

River otters are found in most of the major drainages in Unit 22. Information from trapper surveys in 2000-01 indicates that otters were common and their numbers stable in most of the unit. From 1993 to 2002, reported harvest of river otters through sealing certificates ranged from 2-22 (Gorn 2004). In Unit 23, river otters were taken primarily by recreational trappers.

From 1993 to 2002, reported harvest of river otters through sealing certificates ranged from 0-10 annually (Dau 2004b). River otters are not commonly found in Unit 26A (Carroll 2004b).

In Unit 22, beavers are most common in subunits 22A, 22B, 22C, and 22D, and appear to be increasing in subunit 22E (Gorn 2004). In Unit 23 beaver numbers are high in both the Selawik and Kobuk river drainages and they are expanding their populations both north and west. Beavers now occur as far north as the upper Kugururok River and as far west as Rabbit Creek and in the vicinity of Point Hope (Dau 2004b). Residents of Units 22 and 23 are concerned about the increase in beaver populations as these large rodents are considered a nuisance. Some of the concerns associated with increased beaver populations are damming of waterways, inhibiting movement of both salmon and people, increased risk of *Giardia* in drinking water, and blocking of culverts along the road system (Persons 2001, Dau 2004b). The number of beavers reported harvested through sealing certificates in Unit 22 from 1993 to 2002 ranged from 1 in 2002 to 70 in 1996 (Gorn 2004). The sealing requirement for beaver pelts was eliminated in 1999, making sealing certificates for beavers a less reliable source of harvest information (Gorn 2004, Dau 2004b). ADF&G no longer reports beaver harvests for Unit 23 because of the elimination of that requirement.

Mink and martins are most common in Units 22A and 22B where the habitat is more favorable (Persons 2001). The best martin habitat in Unit 23 is in the upper Kobuk River drainage (Dau 2004b). From 1990 to 1991 martins appeared to be expanding their habitat west in Unit 23. During this time, they occurred as far west as the lower Noatak River and were locally abundant in the upper Squirrel River drainage. Since that time, martins appear to have declined in the western coastal portion of the unit (Dau 2004b). Mink inhabit areas throughout Unit 23 but little is known about their abundance or population trend (Dau 2004b).

Both red and Arctic foxes are found in the planning area. Red foxes are abundant in the Nome area and common in many parts of Unit 22 (Gorn 2004) and Unit 23 (Dau 2004b). Red foxes are fairly abundant in the interior regions of Unit 26A and Arctic foxes are abundant on the coastal plain (Carroll 2004b). Both red and Arctic fox numbers were very high in 2000-01 (Dau 2004b, Gorn 2004). Rabies is a problem in both red and Arctic foxes. There is no sealing requirement for these species so no harvest information is available (Carroll 2004b).

Muskrats occur throughout Unit 23 and spring muskrat hunting used to be an important subsistence activity in the area. No specific information is available on abundance, population trend, or harvest levels (Dau 2004b).

Since these species occupy a wide variety of habitats, it is difficult to generalize on habitat condition. However, most of the BLM-managed land is in a natural state, permitted activities are minimal (limited mainly to special recreation permits for guided hunts with occasional permits for overland movement of mining equipment or projects such as a remote weather station or research project), and no specific threats to the quality of the habitat are known.

ADF&G management goals for furbearers for Units 22, 23, and 26A, while recognizing that populations fluctuate in response to environmental factors, are to:

- Maintain populations capable of sustained yield harvests in Unit 26A.
- Maintain populations capable of 1986-97 harvest levels in Unit 23.
- Maintain viable numbers of furbearers in Unit 22 (Carroll 2004b, Dau 2004b, Gorn 2004).

### *(9) Migratory Birds*

According to ADF&G, 471 species of bird have been positively identified in Alaska (ADF&G 2004). Many of these species occur in the planning area, including some rare western Alaska species and Asian accidentals. Numerous species of raptors inhabit the planning area including golden eagle, peregrine falcon, osprey, gyrfalcon, northern harrier, American kestrel, merlin, sharp-shinned hawk, northern goshawk, rough-legged hawk, great horned owl, great gray owl, snowy owl, northern hawk owl, short-eared owl, and boreal owl. Many of these species are uncommon to rare due to a lack of suitable habitat. Those species dependant upon forested habitats are generally most common in the eastern portions of the planning area.

Wetland habitat within the planning area is used by populations of waterfowl, including ducks, geese, swans, loons, grebes, cormorants, and shorebirds. These species occupy a wide variety of habitats including coastal wetlands, ponds and lakes, and inland streams.

McCarthy's Marsh and the upper Kuzitrin River located on the Seward Peninsula provide important habitat for waterfowl. These areas include about 154 square miles and 183 square miles of wetland habitat, respectively (Jandt and Morkill 1994). Based on ground brood counts between 1989 and 1993, the average number of duck broods per square mile in McCarthy's Marsh and the upper Kuzitrin River were 25 and 28, respectively (Jandt and Morkill 1994). Although these areas are small, waterfowl production on a per unit basis was comparable to the Koyukuk and Yukon Delta NWRs, both important waterfowl brood areas in Alaska. On the Seward Peninsula study areas, American wigeon, mallard, green-winged teal, northern shoveler, and northern pintail were the predominate dabbling ducks found. Greater scaup, long-tailed duck (previously known as oldsquaw), and black scoter were the most common diving ducks. Other species observed during the surveys included tundra swan, red-necked grebe, Arctic loon, common loon, yellow-billed loon, pacific loon, greater white-fronted goose, Canada goose, and sandhill crane (Jandt and Morkill 1994, Anderson and Robinson 1991).

Because of the variety of habitats preferred by the varying species of birds that migrate to Alaska each year, migratory birds are known to occupy every habitat type within the planning area including riparian, wetland, forest, shrub, and tundra. In landscapes dominated by tundra, riparian corridors consisting of tall willow and alder shrubs support the highest diversity of landbirds (BPIF 1999). Little is known about the population trends of Alaskan landbirds, but Alaskan habitats are still relatively undisturbed (BPIF 1999).

In 1990, U.S. Partners in Flight was organized as a coordinated, cooperative conservation initiative focusing on reversing downward trends of declining non-game landbird species. The group is a coalition of government agencies, conservation groups, academic institutions, private businesses, and citizens. In 1992, the Boreal Partners in Flight Working Group was formed under the umbrella of the Western Working Group of the U.S. Partners in Flight program. Members include the BLM, Fish and Wildlife Service (FWS), NPS, Forest Service, USGS, and ADF&G. The purpose of the Boreal Working Group is to develop and coordinate a network of integrated research, monitoring, and educational programs specific to neotropical landbirds that breed in Alaska (BPIF 1999).

The Boreal Partners in Flight Working Group (1999) has identified the following priority species for western and northern Alaska: gyrfalcon, snowy owl, gray-cheeked thrush, varied thrush, blackpoll warbler, golden-crowned sparrow, Smith's longspur, McKay's bunting, rusty blackbird, and hoary redpoll. Many of these depend upon shrub habitats, which is likely the most

important landbird habitat in western Alaska (BPIF 1999). The Boreal Working Group developed a Landbird Conservation Plan for Alaska Biogeographic Regions in 1999

The overall goal of the Landbird Conservation Plan is to keep landbirds well distributed across the landscape in Alaska. The primary conservation action recommended within the planning area is broad scale monitoring of priority species. No imminent threats have been identified for these species.

Because migratory birds occupy a wide variety of habitats, it is difficult to generalize on habitat condition. However, most of the BLM-managed land is in a natural state, permitted activities are minimal, and no specific threats to the quality of the habitat are known. Those migratory bird species that are special status species (threatened, endangered, or BLM sensitive) are discussed in more detail in the Special Status Wildlife section beginning on page 3-85.

INSERT 11x17 MAP
**3_11_ungulates**

INSERT 11x17 MAP
**3_12_ungulates_bou**

# *7. Special Status Species*

Special Status Species (SSS) include species from three different categories:

- Those that have been proposed for listing as threatened or endangered, are officially listed as threatened or endangered, or are candidates for listing as threatened or endangered under the provisions of the Endangered Species Act (ESA),
- Those listed by a state in a category such as threatened or endangered, implying potential endangerment or extinction, and/or
- Those designated by the BLM State Director as sensitive.

BLM policy is to conserve proposed and listed species and the ecosystems upon which they depend, and to use existing authorities to further the purposes of the ESA. For candidate species, BLM policy is to conserve candidate species and their habitats to ensure that actions authorized, funded, or carried out by the BLM do not contribute to the need for the species to become listed. State laws protecting State-listed species apply to all BLM programs and actions to the extent they are consistent with Federal laws. At a minimum, sensitive species are managed the same level of protection as candidates species (BLM 2001a).

Sensitive species are designated by the BLM State Director, usually in cooperation with State agencies or State Natural Heritage Programs. A designation of sensitive is generally applied to species that occur on BLM-managed lands and for which the BLM has the ability to affect conservation through management actions. In Alaska, the designation as a sensitive species usually indicates a complete inventory of species distribution has not been completed. The list of sensitive species is periodically reviewed and updated per BLM manual direction (BLM 2001a). The BLM-Alaska Sensitive Species list was last issued in October 2005 (BLM 2005l). Other species that are not Federally or State listed, or that are not on the BLM sensitive species list may still be considered rare, unique, under consideration for future addition to the sensitive species list, or of special concern for some other reason. However, because some species in these categories do not fit the definition of SSS as described above, they are addressed under the appropriate Vegetation (beginning on page 3-27), Fish (beginning on page 3-47), or Wildlife (beginning on page 3-54) sections.

## a) Special Status Plants

### *(1) Threatened and Endangered Species*

Alaska has only one Federally listed plant species. The endangered Aleutian shield-fern (*Polystichium aleuticum*) grows in moist, rocky alpine terrain on Adak and Atka islands. This small fern is endemic to the central portion of the Aleutian Island chain, and actually has not been relocated on Atka since its original collection in 1932. It is not expected to occur within the planning area.

### *(2) BLM Sensitive Species*

Of the 32 plant species currently shown on the BLM-Alaska Sensitive Species List, only eight have been documented within the planning area (Table 3-5). However, ongoing botanical inventory by various Federal, State, university, and private groups plus opportunistic fieldwork

discovery means that new species and new collection locations are found every year. The BLM-Alaska Sensitive Species List undergoes periodic review, with the potential to add new rare species or remove species as larger, more secure populations are discovered, or taxonomic questions resolved. Information is fairly good on planning area distribution of the eight plant species identified as sensitive. Data on population size and trend is limited.

Sources used to verify sensitive or rare plant species occurrence within the planning area included:

- ARCTOS Database, UAF Museum Herbarium
- ANHP database
- UAF Herbarium (Northern Plant Documentation Center)
- Alaska Rare Plant Field Guide (Lipkin and Murray 1997)
- Flora of Alaska and Neighboring Territories (Hulten 1968)
- Various gray literature reports on floristic inventories, many written by Carolyn Parker, at the UAF Herbarium
- Personal field notes and observations

**Table 3-5. BLM Sensitive Plant Species in Alaska**

| Scientific Name | Common Name | Occurrence in Planning Area |
|---|---|---|
| **BLM Sensitive Species** | | |
| *Artemisia aleutica* | Aleutian wormwood | Absent |
| *Artemisia globularia* var. *lutea* | purple wormwood | Present |
| *Artemisia senjavinensis* | yellow-ball wormwood | Present |
| *Aster pygmaeus* | Pygmy aster | Absent |
| *Beckwithia glacialis* ssp. *alaskensis* | Alaskan glacier buttercup | Present |
| *Botrychium ascendens* | moonwort | Absent |
| *Claytonia ogilviensis* | Ogilvie Mountains springbeauty | Absent |
| *Cochlearia sessilifolia* | sessile-leaved scurvy grass | Absent |
| *Cryptantha shackletteana* | Shacklette's catseye | Absent |
| *Douglasia beringensis* | Bering dwarf primrose | Present |
| *Draba aleutica* | Aleutian whitlow-grass | Absent |
| *Draba kananaskis* | tundra whitlow-grass | Absent |
| *Draba micropetala* | alpine whitlow-grass | Absent |
| *Draba murrayi* | Murray's whitlow-grass | Absent |
| *Draba ogilviensis* | Ogilvie Mountains whitlow-grass | Absent |
| *Erigeron muirii* | Muir's fleabane | Absent |
| *Eriogonum flavum* var. *aquilinum* | Yukon wild buckwheat | Absent |
| *Erysimum asperum* var. *angustatum* | narrow-leaved prairie rocket | Absent |
| *Lesquerella calderi* | Calder's bladderpod | Absent |
| *Ligusticum caldera* | Calder's licorice-root | Absent |
| *Mertensia drummondii* | Drummond's bluebell | Absent |
| *Oxytropis arctica* var. *barnebyana* | Arctic locoweed* | Present |
| *Oxytropis kobukensis* | Kobuk locoweed | Present |
| *Pedicularis hirsuta* | hairy lousewort | Present |
| *Pleuropogon sabinei* | nodding semaphore grass | Absent |
| *Poa hartzii* var. *alaskana* | Alaska bluegrass | Absent |
| *Podistera yukonensis* | Yukon podistera | Absent |
| *Potentilla stipularis* | stipulated cinquefoil | Present |
| *Salix reticulata* ssp. *glabellicarpa* | Smooth-fruited netleaf willow | Absent |
| *Saxifraga aleutica* | Aleutian saxifrage | Absent |

| Scientific Name | Common Name | Occurrence in Planning Area |
|---|---|---|
| **BLM Sensitive Species** | | |
| *Senecio moresbiensis* | mountain avens | Absent |
| *Smelowskia pyriformis* | pear-shaped candytuft | Absent |

Source: IM AK-2004-028 *Formerly a category 2 candidate species

During the last 12 years (1992-2004) botanical inventory has focused on two main regions within the planning area where the BLM manages large blocks of public lands: the Squirrel River to the north and the central/southern Nulato Hills to the south. Fieldwork in the Squirrel River (1992-96) initially targeted the floodplain and riparian corridor along the main stem of the river, and then shifted to upland and alpine areas adjacent to the major south-flowing tributaries. Fieldwork in the Nulato Hills was conducted primarily in alpine habitats (1997-98). Valuable new information on location and population size of sensitive and other rare plants was documented, as was the occurrence of many range extensions and connections.

Smaller BLM parcels in the Seward Peninsula have been botanically explored by BLM botanists, natural resource specialists, and wildlife biologists to a certain extent, including the Kigluaik Mountains, Sinuk River uplands, South Fork Buckland River, Wrench Lake area, McCarthy's Marsh, and Clear Creek Hot Springs. Botanical collections have been made at specific sites on the Baldwin Peninsula and Pah River flats, north of the Seward Peninsula. Opportunistic plant collections have been made during reindeer and caribou habitat assessments and during compliance visits to mine site/gravel sale sites or recreation impact river surveys.

### Ranking System

BLM-Alaska has relied on the ranking system developed by the ANHP and The Nature Conservancy, plus an international network of natural heritage programs and conservation database centers that assess state and global rarity, for assistance in developing sensitive species lists for Alaskan plants, birds, mammals, and fish. A brief overview of the global and state ranking criteria is given below.

**Table 3-6. Global and State Ranking Criteria**

| Rank | Description |
|---|---|
| **Global** | |
| G1 | Critically imperiled globally because of extreme rarity (1-5 occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction. Considered critically endangered throughout its range. |
| G2 | Imperiled globally because of rarity (6-20 occurrences) or because of other factors demonstrably making it very vulnerable to extinction throughout its range. Considered endangered throughout its range. |
| G3 | Either very rare and local throughout its range or found locally (even abundantly at some locations) in a restricted range (21-100 occurrences). Considered threatened throughout its range. |
| G4 | Widespread and apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery. |
| G5 | Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery. |
| G#G# | Global rank of species uncertain, best described as a range between the two ranks. |
| G#Q | Taxonomically questionable. |
| G#T# | Global rank of the species, and global rank of the described subspecies or variety |

| Rank | Description |
|---|---|
| **Global** | |
| G? | Unranked. |
| **State** | |
| S1 | Critically imperiled in state because of extreme rarity (1-5 occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction. Considered critically endangered throughout the state. |
| S2 | Imperiled in the state because of rarity (6-20 occurrences), or because of other factors making it very vulnerable to extirpation from the state. |
| S3 | Rare or uncommon in the state (21-100 occurrences). |
| SP | Occurring in nearby state or province; not yet reported in state, but probably will be encountered with further inventory. |
| S#S# | State rank of species uncertain, best described as a range between the two ranks. |
| S? | Unranked. |
| **Qualifiers** | |
| ? | Inexact. |
| Q | Questionable taxonomy. |

Source: Lipkin and Murray 1997

Map 3-13 shows all special status plant locations in the planning area, regardless of land ownership.

### BLM Sensitive Species

This section describes the BLM-Alaska sensitive plant species occurring in the planning area. Discussions cover species locations, brief habitat data, population numbers and trends (if known), any known threats, and rare plant rankings. See Table 3-5 on page 3-72 for a list of the sensitive plant species described in the text, showing their scientific and common names and ANHP-assigned ranks. Descriptions of other rare plant species that occur in the planning area but are not designated BLM sensitive species are included in the Vegetation section under Rare Plants Not Classified as BLM-Alaska Special Status Species beginning on page 3-32.

***Artemisia globularia* var. *lutea* (purple wormwood).** This short, bright yellow-flowered member of the aster family is endemic to the southwestern Seward Peninsula and to adjacent islands in the Bering Sea (St. Matthew, St. Lawrence, and Pribilof islands). It is found at low elevation alpine habitats, often on dry slopes among granite scree or boulders, in gravels along stream banks, or on exposed moist acidic tundra with dwarf willow, forbs, and sedges.

This species has been found in four locations in Alaska, one of which is within the planning area. Three islands in the Bering Sea are the principal locations: St. Lawrence and the Pribilof islands are Native corporation owned, and St. Matthew Island is part of the Alaska Maritime NWR. However, the Crete Creek collection site on the western flank of the Kigluaik Mountains is on low priority State-selected lands, with underlying BLM management (Map 3-13).

On St. Matthew Island, collection dates range from 1954 to 1982. Collection dates span from 1982 to 1993 at Crete Creek. No information is readily available on population size or trend, but the presence of relocatable populations over periods of 28 and 11 years indicates persistence over time. Threats to these four populations include natural disturbances, reindeer grazing, and human trampling.

Ranking: ANHP – G4T1T2Q/S1S2; currently on BLM-Alaska SSS plant list. The *Atlas of Rare Endemic Vascular Plants of the Arctic*, developed by the international Conservation of Flora and Fauna program in 1999, places *A. globularia* var. *lutea* in the IUCN category of Lower Risk (taxa that do not satisfy the criteria of critically endangered, endangered, or vulnerable) (Talbot et al. 1999).

***Artemisia senjavinensis* (yellow-ball wormwood).** This low-growing, yellow-flowered sagebrush relative is endemic to the Seward Peninsula and southeastern Chukota Peninsula in Russia. Found at a range of elevations, from rocky coastal headlands to alpine scree slopes and ridge tops, it favors dry calcareous sites and limestone outcrops.

The Seward Peninsula is a patchwork quilt of land ownership, and the known populations of *Artemisia senjavinensis* (yellow-ball wormwood) reflect this. This sensitive plant species is found on Native corporation patented, interim-conveyed, and selected lands, on State-selected lands, on dual-selected lands, and on military withdrawal lands. All of the selected lands are currently under BLM management, and some proportion will likely remain so. Approximately one-half of the known locations of *A. senjavinensis* occur on State-selected or Native corporation land (Map 3-13).

Information on population size, trend, and potential threats is not available. However, *Artemisia senjavinensis* has been collected from close to 30 sites on the Seward Peninsula, including the Kigluaik Mountains, Anvil Mountain, southwest of Council, Bluff, northeast of Cape Rodney, Lost River, Wales, and Tin City, from 1954 to 2003, so it is assumed the species is persisting in a sound ecological condition.

Ranking: ANHP – G3/S2S3; currently on BLM-Alaska SSS plant list.

***Beckwithia glacialis* ssp. *alaskensis* (Alaskan glacier buttercup).** (Most recent taxonomy is tentatively *Ranunculus glacialis*).[1] This short, white-flowered buttercup (petals often tinged with red) represents a remarkable disjunction from the European Alps, being found in only two areas in North America – eastern Greenland and the Kigluaik Mountains of the southern Seward Peninsula (Map 3-13). It has been found at seven locations within the Kigluaik Mountains, typically on steep, south-facing scree slopes mantled with small flat pieces of schist and shale (Murray and Lipkin 1998, Talbot et al. 1999). This species appears to tolerate substrate ranging from acidic to neutral to slightly basic.

This sensitive species plant has been found in Alaska only in the Kigluaik Mountains. The Kigluaik Mountains are State-selected, with BLM management in the interim. The State has assigned low priority to these selections, and it is quite likely that most or all of the Kigluaik Mountains will remain under BLM management. Murray and Lipkin (1998) found hundreds of plants at each of seven locations in the Kigluaik Mountains, and estimated they saw many thousands of *B. glacialis* ssp. *alaskensis* during their floristic survey of the area. These are

[1] Due to the dynamic nature of plant taxonomy, recent molecular work in Austria with Alaska plant material indicates the species shown as *Beckwithia glacialis* ssp. *alaskensis* on the 2004 BLM-Alaska SSS list is now tentatively understood to be *Ranunculus glacialis* (Murray and Lipkin 2005). Because the widely referenced *Rare Plant Field Guide to Alaska Plants* (Lipkin and Murray 1997), the *Atlas of Rare Endemic Vascular Plants of the Arctic* (Talbot et al. 1999), and the 2004 BLM-Alaska SSS list use the Beckwithia nomenclature, Kobuk-Seward Peninsula planning documents will continue to use *Beckwithia glacialis* ssp. *alaskensis*.

remote locations, judged to be protected by their isolation (Murray and Lipkin 1998). No information is available on population trend.

Ranking: ANHP – G4T3T4/S2; currently on BLM-Alaska SSS plant list. The *Atlas of Rare Endemic Vascular Plants of the Arctic* places *B. glacialis* ssp. *alaskensis* in the IUCN category of Vulnerable (taxa not critically endangered or endangered but facing a high risk of extinction in the wild in the medium-term future) (Talbot et al. 1999).

***Douglasia beringensis* (Bering dwarf primrose).** An East Beringian endemic species (e.g., restricted to western Alaska), the compact pink-flowered member of the primrose family was new to North America when it was discovered at Trail Creek, Seward Peninsula in 1992 (Kelso et al. 1994). Since then additional populations have been found in northcentral and southwestern Seward Peninsula (Crossfox Butte and Sinuk River uplands, respectively), the central and southern Nulato Hills, and the Lime Hills in southwestern Alaska. Only the Lime Hills populations are outside the planning area. (Note: a small, poorly preserved specimen that may be this species was collected in the Kokrines Hills northeast of Galena in 1979.) (Map 3-13).

Small populations of *Douglasia beringensis* have been found on NPS and State-selected lands in northcentral and southwestern Seward Peninsula. Larger populations of several thousand individuals have been documented on BLM lands in the central and southern Nulato Hills. Outside the planning area, two small populations were discovered on BLM-managed lands in the Lime Hills in southwestern Alaska.

The Seward Peninsula and Lime Hills populations are small, and grow on limestone outcrops in alpine habitats. Three of the Nulato Hills populations are larger, varying from 100-2,000 individuals to several thousand plants, and are found on acidic substrates in fine to coarse alpine screeslopes (Parker 1999).

No information is available on population trend or threats, although most of the populations inhabit remote mountainous terrain.

Ranking: ANHP – G2/S2; currently on BLM-Alaska SSS plant list.

***Oxytropis arctica* var. *barnebyana* (Barneby's locoweed).** Taxonomic uncertainty and difficulties delayed conclusive identification of scattered collections of white-flowered *Oxytropis* made from northwest Alaska during 1989-2003, and made comparison with the original Kotzebue area population collected in 1966 and named by Dr. Stanley Welsh in 1968 more difficult. A status survey conducted in 1984 for the FWS established the *Oxytropis arctica* var. *barnebyana* (known affectionately as OAB) subpopulations in Kotzebue as totaling 1,487 individuals (Lipkin 1985a). OAB was treated as a Category 2 candidate species under the ESA and each new version of the Alaska rare plant field guide treated OAB as a rare and vulnerable species with a single population locus in Kotzebue (Murray 1980, Murray and Lipkin 1987, Lipkin and Murray 1997). The series of conservation measures taken over the years is briefly described below, under Conservation Agreement for *Oxytropis arctica* var. *barnebyana.*

OAB has been documented in five main locations in northwestern Alaska: Kotzebue (USAF withdrawal), Squirrel River (BLM), Noatak National Preserve (NPS), Cape Krusenstern National Monument (NPS), and Bering Land Bridge National Preserve (NPS) (Map 3-13). The largest known populations occur on BLM-managed lands in the Squirrel River. A BLM/FWS crew

conducted a survey of OAB at the North Fork and No Name Creek,[2] Squirrel River drainage, in July 1996 and made a population count of 15,782 individuals for the area they surveyed (Moran 1997). The habitat most often occupied by OAB in northwest Alaska is mid to upper floodplain terraces, but it is also found on older vegetated beach ridges and well-drained upland meadows. Given the opportunity, OAB may colonize gravel pads and less traveled gravel roadsides, as it has done in a few locations one to three miles south of Kotzebue.

Results of DNA analysis of OAB conducted from 1997 to 2001 suggested that the original population found by Welsh in 1966 was not distinct from other populations Alaska, such as those in the Squirrel River (Jorgensen et al. 2003). This was encouraging news, since the Kotzebue population was increasingly threatened and had suffered some unavoidable habitat loss. Genetic analysis performed to this point provide no support for special conservation status for OAB (Jorgensen et al. 2003). However, known sites for OAB in Alaska still number approximately 13, well within the 6-20 range of known populations used by ANHP for their S2 ranking. The Kotzebue OAB population remains vulnerable to continued municipal development and infrastructure expansion.

As previously stated, a completed status survey of OAB in 1984 documented the Kotzebue population as totaling 1,487 individuals in several subpopulations (Lipkin 1985a). By July 1995 when a BLM/FWS field crew conducted a census of the Kotzebue OAB population they discovered a significant increase to approximately 8,391 flowering and vegetative plants (Willeck 1996). A BLM botanical inventory during July 1995 discovered and made collections from a large population of white-flowered *Oxytropis* on BLM-managed lands at No Name Creek, Squirrel River (Meyers 1995a). During July 1996 a BLM/FWS field crew carried out an inventory and population estimate for the white-flowered *Oxytropis* at both No Name Creek and the North Fork, in the Squirrel River drainage. They estimated a total of 15,782 individuals (Moran and Meyers 1996).

As of December 2004, no further census work has been conducted for the Kotzebue or Squirrel River populations of OAB. The prevalence of natural conditions in the Squirrel River and occasional site visits during other BLM fieldwork indicate no major changes have occurred in OAB population numbers in the Squirrel River drainage.

However, the years 1996-2000 were hard on the Kotzebue OAB population because of habitat and biomass losses due to Congressionally-mandated restoration at U.S. Air Force (USAF) Long Range Radar Site (LRRS) and White Alice Communication Site gravel pads three miles south of Kotzebue. Having the OAB Conservation Plan in place moderated the losses but could not prevent them. In addition, pond dredging and gravel stockpiling by a local Native village corporation adjacent to and within OAB beach ridge habitat just south of Kotzebue negatively impacted OAB numbers, even though some mitigation activities were carried out. BLM, FWS, and ADNR Plant Materials Center personnel plus local volunteers worked diligently on mitigation measures for OAB from 1995-2002: mapping, staking, and flagging threatened OAB populations; transplanting; seed collection; greenhouse grow out in Palmer and planting of seedlings in Kotzebue; broadcast of seed; and survivorship monitoring (Moore 2004, Meyers 2003a).

The population trend for the generally remote populations of OAB in the central and northern Seward Peninsula, Cape Krusenstern National Monument, Squirrel River, and mid and upper

[2] No Name Creek is a local name for unnamed tributary to the Squirrel River immediately adjacent to and west of the North Fork.

Noatak River drainage is estimated as stable. However, it is likely that OAB population numbers in the Kotzebue area have decreased from their 1995 levels due to habitat and biomass loss described above. As of September 2002, the OAB subpopulation found on low beach ridge habitat just south of Kotzebue (an area locally known as "south tent city") showed signs of competitive decline in vigor and number of plants. In the course of natural succession several species of willow and dwarf ericaceous shrubs are starting to overtop, shade, and crowd the lower-growing OAB rosettes (Meyers 2002). However, given time and the current low levels of disturbance at the large empty gravel pads at the USAF LRRS three miles south of Kotzebue, the vigorous colonization characteristic of OAB should allow that species to regain lost population numbers in the Kotzebue area.

Ranking: ANHP – G4?T2/S2; currently on BLM-Alaska SSS plant list. *The Atlas of Rare Endemic Vascular Plants of the Arctic* places OAB in the IUCN category of Lower risk, Near threatened, for taxa which do not qualify for conservation dependent, but which are close to qualifying for vulnerable (Talbot et al. 1999). (Note that CAFF uses the synonym *Oxytropis sordida* ssp. *barnebyana*.)

Conservation Agreement for *Oxytropis arctica* var. *barnebyana*

In April 1996 a five-year Conservation Agreement was signed by FWS and USAF to conserve, protect, and conduct mitigation practices for the population of *Oxytropis arctica* var. *barnebyana* at the Kotzebue LRRS. The BLM, ADNR Plant Materials Center, and UAF were partners in this effort. After the original Conservation Agreement expired in 2001, USAF supplied additional funding through their project Propagate Oxytrope Kotzebue, which ran from 2001 to 2003 for further mitigation measures. In cooperation with the UAF Herbarium, BLM wrote a proposal for DNA analysis of the Kotzebue and Squirrel River *O. arctica* var. *barnebyana* populations, for further clarification of taxonomic uncertainties concerning this species. The proposal was funded by USAF in March 1998, and became part of Master's thesis research to examine taxonomic and biogeographic questions involving the *Oxytropis campestris* and *O. arctica* complexes in Arctic and interior areas of Alaska (Jorgensen et al. 2003).

During the years spanning 1995 to November 2004 OAB conservation and mitigation efforts carried out by BLM and other Conservation Agreement partners have included: mapping, staking, and flagging threatened OAB populations; transplanting; seed collection; population census of Kotzebue and Squirrel River populations; search for additional populations on the Baldwin Peninsula south of Kotzebue; greenhouse grow-out in Palmer and planting of seedlings in Kotzebue; broadcast of seed in Kotzebue; survivorship monitoring in Kotzebue; and informal consultations and site visits with interested municipal, State and Federal agencies, Tribal organizations and private groups on the status and location of OAB populations in Kotzebue and elsewhere in northwest Alaska (Moore 2004, Meyers 2003).

***Oxytropis kobukensis* (Kobuk locoweed)** occurs in very specialized habitats within the planning area, all on NPS-managed lands (Map 3-13). *O. kobukensis* is restricted to three active dune fields found along a 25-mile stretch of the Kobuk River from Kavet Creek to Onion Portage, and to portions of stabilized, vegetated sand sheets surrounding these dunes. The Great Kobuk Sand Dunes, the Little Kobuk Sand Dunes, plus the Hunt River dunes are all on the south side of the Kobuk River, within Kobuk Valley National Park. Botanists have searched small remnant dune fields near the active Kobuk River dunes and other dune fields scattered across the state, but have not found any additional populations of *O. kobukensis.*

*Oxytropis kobukensis* is a narrow endemic, restricted to sand dune-associated substrates in the Kobuk River valley. Status survey field work in 1984 documented five populations, several of which were quite large, containing many thousands of individual plants. Total population was estimated at possibly over one million, and perhaps as many as several million (Lipkin 1985b). Information on population trend is not readily available, but in 1984 the plants were healthy, propagating vegetatively (with only a few seedlings seen), and producing fairly abundant flowers and fruits. Main causes of mortality were judged to be from wind excavation or burial, both characteristic of sand dune habitats. Populations at the major sites appeared stable, with vegetative reproduction adequate to maintain the population (Lipkin 1985b).

No current threats exist, and all populations remain under the protective management of the NPS. Long-term, climatically-driven cycles of dune expansion or contraction could potentially affect population size and health in the future.

Ranking: ANHP – G2/S2; currently on BLM-Alaska SSS plant list.

***Potentilla stipularis* (stipulated cinquefoil).** This Asian disjunct and yellow-flowered member of the rose family has been collected at only six locations in north and northwest Alaska (Map 3-13). For some years the earliest collection near Umiat (pre-1968) was the only site known in the state. In 1980 and 1996 *Potentilla stipularis* was discovered on BLM land (now State-selected) at two sites on the West Fork of the Buckland River. In 2001 and 2002 botanical inventory in the Noatak National Preserve by UAF Herbarium personnel, with some assistance from BLM, found *P. stipularis* growing in a total of three locations in the Anisak River/Desperation Lake areas and along the crest of the western Brooks Range (headwaters of Kagvik Creek), outside the planning area.

*P. stipularis* often grows on moist, vegetated floodplains or low river banks, in grassy meadows on riparian terraces or in moist Dryas-heath tundra adjacent to lakeshores or alpine creeks. It has been collected from two sites in the Buckland River drainage on State-selected access corridors within larger blocks of BLM land. In August 1996, at the West Fork of Buckland River, a BLM field crew counted a small population of 59 healthy, post-flowering and post-fruiting individuals in a roughly 20 by 80 foot patch in a grassy meadow ringed by willow and alder (Meyers 1996a). It was reported as “abundant” along banks of the West Fork, Buckland River in 1980 (Lipkin 1995). Otherwise, population sizes and trends are largely unknown.

The original, pre-1968 collection (for a long time the only known location in Alaska for *P. stipularis*) is in the vicinity of Umiat, within the NPR-A, on the west side of the Colville River (Lipkin 2005, Hulten 1968). With the exception of Umiat, these are remote to infrequently visited areas. Several populations are adjacent to large rivers, which could be periodically impacted by natural disturbances such as flooding, bank erosion, and ice scour.

Ranking: ANHP – G5/S1; currently on BLM-Alaska SSS plant list.

***Pedicularis hirsuta* (hairy lousewort).** This pink-flowered member of the figwort family is known from only one location in Alaska, although it is more common in the Arctic of eastern Canada, Greenland, Arctic Asia, and northern Norway. It is similar to the widespread and abundant *Pedicularis lanata*, found across Arctic Alaska, Arctic Canada, and Greenland, and may have occasionally been overlooked in Alaska due to its resemblance to the more common species. It was collected in July 1992 by Alaskan and Soviet botanists from the lower, north-facing slopes of Mount Boyan, south of Kuzitrin Lake in southcentral Seward Peninsula, on

BLM-managed lands (Map 3-13). No information is available on population size, trend, or threats.

Ranking: ANHP – G5?/S1; currently on BLM-Alaska SSS plant list.

INSERT 11x17 MAP
**3_13_sss_plants**

.

# b) Special Status Fish

## *(1) Threatened and Endangered Species*

There are no threatened, endangered, or candidate fish species present within the planning area.

## *(2) BLM Sensitive Species*

At least six of the Kigluaik Mountain's 50 lakes located 30 miles north of Nome contain populations of Arctic char (Kigluaik Arctic char) that were designated as a BLM Sensitive Species due to their unique genetic makeup, body form, slow growth, and susceptibility to overharvest (Kretsinger 1987, Webb 1999). These lakes are Fall Creek (upper, middle, and lower), Crater, Snow Creek, and Gold Run, as shown on Map 3-14. This lake habitat comprises approximately 500 acres (Kretsinger 1987, Webb 1999). The fish are present in the nutrient-poor alpine lakes of the Kigluaik Mountains, which are ice-covered nine months of the year. The cold water and limited forage base afforded these fish result in slow-growth and long-lived fish. Genetic analysis performed by the BLM on fish collected from Fall Creek and Crater lakes indicate the fish were more closely related to European fish, as opposed to other Alaskan, Russian, or British Columbian stocks (Webb 1999).

Although genetic samples were collected and meristic measurements were recorded by the BLM, and species presence in some of the lakes has been documented (Webb 1999), no population estimates have been made due to budget constraints, though baseline studies are scheduled to begin in 2006 at Fall Creek and Crater lakes. Recreation use in the Kigluaik Mountains is increasing based upon the number of hikers and OHV users who visited the Glacial Lake sockeye salmon counting camp from 2000 to 2005, and increased fishing pressure on char-bearing lakes is likely.

**Table 3-7. Fish Special Status Species Occurring in the Planning Area**

| Scientific Name | Common Name | Occurrence in Planning Area |
|---|---|---|
| **BLM Sensitive Species** | | |
| *Salvelinus alpinus* | Kigluaik Arctic char | Limited to lakes in the Kigluaik Mountains |

INSERT 8½x11 MAP
**3_14_sss_char**

# c) Special Status Wildlife

## *(1) Threatened, Endangered, and Candidate Species*

There are two threatened species, Steller's eider and spectacled eider, and one candidate species, Kittlitz's murrelet, in the planning area (Table 3-8). There is no designated critical habitat within the planning area, although there are two designated Critical Habitat units off the coast of the planning area.

**Table 3-8. Wildlife Special Status Species Likely to Occur in the Planning Area**

| Scientific Name | Common Name | Occurrence in Planning Area |
|---|---|---|
| **Threatened Species** | | |
| *Polystricta stelleri* | Steller's eider | Casual |
| *Somateria fischeri* | Spectacled eider | Rare |
| **Candidate Species (also a BLM sensitive species)** | | |
| *Brachyramphus brevirostris* | Kittlitz's murrelet | Rare to uncommon |
| **BLM Sensitive Species** | | |
| *Branta bernicla* | Black brant | Common/uncommon |
| *Calidris canutus* | Red knot | Uncommon/common |
| *Catharus minimus* | Gray-cheeked thrush | Common breeder |
| *Cepphus grylle* | Black guillemot | Uncommon/rare |
| *Clangula hyemalis* | Old squaw | Abundant breeder |
| *Contopus cooperi* | Olive-sided flycatcher | Rare breeder |
| *Cygnus buccinator* | Trumpeter swan | Casual |
| *Dendroica striata* | Blackpoll warbler | Common breeder |
| *Falco peregrinus tundrius* | Arctic peregrine falcon | Uncommon |
| *Gavia adamsii* | Yellow-billed loon | Uncommon |
| *Gavia stellata* | Red-throated loon | Common to abundant |
| *Histrionicus histrionicus* | Harlequin duck | Uncommon breeder |
| *Limosa limosa* | Black-tailed godwit | Casual/accidental |
| *Lynx canadensis* | Canada lynx | Common |
| *Melanitta nigra* | Black scoter | Common breeder |
| *Melanitta perspicillata* | Surf scoter | Common/uncommon |
| *Numenius tahitensis* | Bristle-thighed curlew | Rare breeder |
| *Plectrophenax hyperboreus* | McKay's bunting | Uncommon/rare |
| *Somateria spectabilis* | King eider | Rare migrant/breeder |
| *Tryngites subruficollis* | Buff-breasted sandpiper | Very rare migrant |

### (a) Steller's Eider

Steller's eider probably occurs within the planning area only as a migrant or rare summer visitor (Map 3-15). A few non-breeding birds may summer in Norton Sound and other areas off the coast of the Seward Peninsula (Kessel 1989). The Alaska breeding population is listed as threatened (Federal Register 1997). Current breeding distribution encompasses the Arctic coastal regions of northern Alaska from Wainwright to Prudhoe Bay up to 56 miles inland, and Arctic coastal regions of Russia (Federal Register 1997). Eiders have been documented near Point Lay during aerial surveys on the North Slope between 1986 and 2002 (FWS 2002).

Historically, Steller's eider was a common breeder in the Yukon-Delta but is now rarely found in the area. They apparently nested in low numbers on the Seward Peninsula in the late 1800s (Kessel 1989). Preferred nesting habitat is tundra with numerous ponds of various sizes. They are not as closely tied to the coastal areas as the other eider species. A recovery plan has been developed for the species but the limited distribution of eiders within the planning area and the limited amount of BLM-managed land in the area eiders are most likely to occur make implementation of recovery actions within the planning area unlikely.

### (b) Spectacled Eider

The spectacled eider is listed as a threatened species throughout its range in Alaska (Federal Register 1993b). Historically, spectacled eiders nested discontinuously along the coast of Alaska from Nushagak Peninsula on Bristol Bay to Barrow and east nearly to the Yukon border. Today, almost all spectacled eiders of the North Slope population breed north of 70° latitude between Icy Cape and the Shaviovik River (Federal Register 2001), generally within 43 miles of the coast. The primary breeding areas are located outside of the planning area. Small numbers of spectacled eiders may nest within the planning area near Point Lay (Map 3-15).

Spectacled eiders molt in Norton Sound and Ledyard Bay. Both of these areas are designated as Critical Habitat (Federal Register 2001) and are located off the coast of the planning area. Norton Sound is the principal staging and molting area (July-October) for nesting females and juveniles from the Yukon-Delta population. Up to 4,030 spectacled eiders have been observed in Norton Sound at one time (Federal Register 2001). Ledyard Bay is one of the primary molting grounds for female spectacled eiders nesting on the North Slope. Aerial surveys in 1995 found 33,192 spectacled eiders in Ledyard Bay (Peterson et al. 1999). Post breeding migration corridors are offshore in the Bering, Chukchi, and Beaufort seas. Adult males are at sea for approximately 11 months of the year while adult females spend eight to nine months of the year at sea (Peterson et al. 2000).

The recovery plan for the spectacled eider (FWS 1996) identifies recovery criteria and preliminary management actions needed for delisting. Because of the lack of basic information on spectacled eider distribution, abundance, and population ecology, interim recovery efforts focus on collecting this basic information and targeting known sources of mortality. The limited distribution of eiders within the planning area and the limited amount of BLM-managed land in the area eiders are most likely to occur make implementation of preliminary recovery actions within the planning area unlikely.

The following specific guidelines for activities within the breeding range of spectacled eiders have been developed as part of the recovery plan (FWS 1996). Habitat in the project area should be assessed to determine if eiders are likely to use the area for nesting or brood rearing. The following activities should be prohibited within 656 feet of spectacled eider nest sites:
Ground level activity (by foot or vehicle) from May 20 through August 1.
Construction of permanent facilities, placement of fill, or alteration of habitat.
Introduction of high noise levels within 656 feet of nest sites (from activities at potentially greater distances), May 20 through August 1. These may include but are not limited to airports, blasting, and compressor stations.

### (c) Kittlitz's Murrelet

Kittlitz's murrelet is a Beringian species that nests along most coastal regions from southwestern to western Alaska (Day et al. 1999). In 2001, the FWS was petitioned to list the Kittlitz's murrelet as a threatened or endangered species with designated critical habitat. It was

listed as a candidate species on May 4, 2004 (Federal Register 2004). The scarcity of breeding records makes determination of exact breeding range difficult.

In Alaska, the majority of the summer populations are found in three locations: Southeastern Alaska, Prince William Sound, and Cook Inlet (Day et al. 1999). In western Alaska and Bering Sea islands, Kittlitz's murrelet breeds on the Seward Peninsula westward from Nome to Wales and possibly at Sledge Island (Kessel 1989). Kessel classifies it as a rare breeder on the western half of the Seward Peninsula (Map 3-15). Summer sightings between Nome and Cape Woolley suggest nesting in the Kigluaik Mountains. It also nests north of Kotzebue, from Kivalina to Cape Thomson in the foothills of Brooks Range, and as far north as Cape Lisburne and the Lisburne Hills. In northern Alaska, suitable habitat is lacking north of Cape Beaufort, so the species occurs rarely and probably does not breed north of that location (Day et al. 1999).

Nesting habitat consists of unvegetated, scree slopes or steep, rocky slopes; rarely on cliff faces (Day et al. 1999). Nesting sites are most often inland, up to 16 miles from the coast (Kessel 1989). The winter marine range is poorly known. Few sightings of the species during the winter indicate they probably winter at sea. There is no reliable population information at this time. Indications are that a substantial proportion of the world population died as a result of the Exxon Valdez oil spill in 1989; one estimate of this mortality was 5-10 percent (Van Vliet and McAllister 1994).

This species is sparsely distributed within the planning area. It would be very difficult to inventory nesting habitat in a cost effective manner. There are no known risks to the habitat or species within the planning area.

### *(2) BLM Sensitive Species*

Nineteen birds and one mammal identified as BLM sensitive species occur within the planning area on more than an accidental basis (Table 3-8). Information on distribution, habitat condition, and population trends for most of these species is limited (Map 3-16 and Map 3-17). Only those species occurring in the planning area on more than an accidental basis are discussed below.

Red-throated loon (*Gavia stellata*) is a non-resident breeder throughout the planning area. Kessel (1989) identified it as a common breeder on the Seward Peninsula. It is most abundant in coastal lowlands, but occurs where suitable wetlands are present. According to Barr et al. (2000), red-throated loons prefer tundra and coastal habitats but may be found in the mountains up to 3,280 feet and in some forested regions.

In Alaska, red-throated loons declined by 53 percent from 1977 to 1993. Most of the decline appears to be in western tundra (Groves et al. 1996, McCaffery 1998). Possible mortality factors in Alaska include subsistence hunting and entanglement in fishing nets. Mammalian and avian predation is a common cause of mortality of eggs and chicks. Egg predation by Arctic foxes may be high in years with low rodent populations. Competition with larger loon species for nesting sites may also be a factor (Barr et al. 2000).

Yellow-billed loon (*Gavia adamsii*) is a relatively rare bird in the Arctic tundra regions of North America. A petition to list the species is currently under review by FWS. The yellow-billed loon breeds sparsely in lowlands around Kotzebue Sound north to Point Hope and in large numbers on the North Slope of Alaska (North 1994). Kessel (1989) classifies it as an uncommon migrant and breeder on the Seward Peninsula while being more common on the northern half of the

Peninsula. Earnst (2004) shows yellow-billed loons breeding in McCarthy's Marsh, Selawik NWR, Imuruk Basin, and southern Norton Sound (Map 3-15). This species winters in southeast Alaska. Nests are usually located in low lying, tundra near the coast. Preferred nest sites are located near large, low rimmed lakes or slow moving rivers. They are occasionally taken by subsistence hunters and frequently drown in fishing nets (North 1994). There is potential for impact to this species from oil development in breeding areas on the North Slope.

The wetlands of Seward Peninsula and Selawik NWR were surveyed in 1992-93 and 1996-97 using standard waterfowl breeding pair survey methods. Surveys of the two areas combined, which encompassed all likely yellow-billed loon breeding habitat in western Alaska from the Seward Peninsula north to Point Hope, yielded a population index of 730 ± 126 yellow-billed loons (Earnst 2004). When combined with an estimate of 50 loons on St. Lawrence Island (Fair 2002), the total population index for yellow-billed loons in western Alaska was 780 individuals.

In March 2004, a consortium of environmental groups petitioned the FWS to list the yellow-billed loon under the ESA (Center for Biological Diversity 2004). The FWS is currently considering the petition for listing and will make a finding in the near future.

Trumpeter swans (*Cygnus buccinator*) are uncommon in the planning area, occurring primarily in central and southern Alaska (Mitchell 1994) (Map 3-16). They are normally found in forested areas but are casual breeders west of the taiga of interior Alaska (Hansen et al. 1971). Kessel (1989) cites one record of trumpeter swan eggs collected on the Seward Peninsula in 1902. Breeding swans prefer secluded wetland areas containing extensive areas of shallow lakes with abundant emergent vegetation. Adjacent waters and marshes are important for foraging. They have been relatively unaffected by human development in Alaska and during a 1990 census were found to number over 13,000 statewide (Mitchell 1994).

Black brant (*Branta bernicla*) breed in coastal areas in the northern half of the planning area (Reed et al. 1998) and are common migrants and rare breeders on the Seward Peninsula (Kessel 1989) (Map 3-16). The Alaska population winters along the Pacific coast from Alaska south to Baja California (Reed et al. 1998). Many migrants fly over the Seward Peninsula. Black brant often nest in colonies near salt marshes or on broad estuarine deltas supporting low vegetation. To avoid predators they often builds nest on islands in small ponds or river deltas, on small offshore islands, or on gravel spits. Many failed and non-breeding black brant migrate to the Arctic coastal plain to molt. According to Reed et al. (1998) subsistence hunting is one of the most important factors regulating population size in combination with predation by foxes. Statewide in Alaska, total subsistence harvest of brant in 1994 was approximately 10,000 birds (Reed et al. 1998). Population decline in Alaska since the 1960s is primarily attributed to reductions in the nesting population in the Yukon-Kuskokwim Delta during the 1970s and early 1980s. Although the number of nests has increased since the 1980s, numbers still appear to be below historic levels.

Harlequin duck (*Histrionicus histrionicus*) is an uncommon breeder on the Seward Peninsula where it is widely distributed along clear, shallow, rapidly flowing creeks and rivers (Kessel 1989). This widespread species is also known to breed along glacial lakes, in tundra ponds, and perhaps rarely on offshore rocks in marine waters. It is found throughout much of Alaska, south of the Brooks Range and west to the Seward Peninsula (Robertson and Goudie 1999) (Map 3-16). Harlequin ducks have been recorded over most of Alaska except the Arctic coast (Johnsen and Herter 1989). Most harlequins apparently migrate along the western coast of Alaska to and from wintering grounds further south. Because of their range and habitat preferences for more remote and harsh environments, harlequin duck populations and their

preferred habitat in Alaska have been relatively unaffected by human disturbances and encroaching developments (ADF&G 1994c).

Long-tailed duck (*Clangula hyemalis*), also called oldsquaw, is one of the most common waterfowl on the Seward Peninsula (Kessel 1989). They are widely distributed throughout coastal and interior lowlands, including McCarthy's Marsh and Imuruk Basin. They nest along lagoon shores, in river estuaries, or about freshwater lakes and ponds. In Alaska, deep Arctophila dominated ponds are used early in the season. During breeding, shallow ponds and braided streams are used (Robertson and Savard 2002). After breeding, most adults and fledglings move to coastal ponds and lagoons, or protected marine waters to molt. They commonly winter in the Aleutian Islands and southern Bering Sea. According to Hodges et al. (1996) the breeding population in Alaska has declined 75 percent since 1977 and continues to decline (Conant et al. 1999). Factors contributing to the decline may include subsistence harvest and ingestion of lead shot. Twenty percent of females nesting on the Yukon-Kuskokwim Delta were exposed to ingested lead (Robertson and Savard 2002). There is documented decline in long-tailed duck numbers in Waterfowl Production Units (WPUs) surveyed by the FWS in Alaska, particularly in the tundra habitat zone of western Alaska (Kotzebue Sound, Seward Peninsula, Yukon-Kuskokwim Delta, and Bristol Bay) (Conant and Groves 1998).

Black scoter (*Melanitta nigra*) is common and widely distributed throughout the planning area, breeding on the Seward Peninsula, Kotzebue Sound, and Arctic coastal plain. Molting occurs south of the planning area on the Yukon-Kuskokwim Delta. Black scoters winter in the Aleutian Islands and along the southern coast of Alaska. Nesting habitat includes upland areas with small ponds and at the transition zone between the uplands and coastal lowlands (Kessel 1989). FWS North American Waterfowl Breeding Population Survey (NAWBPS) indicates members of the scoter group have been in a slow steady decline since initiation of the survey in 1957 (Hodges et al. 1996). In a review of data from 1977 to1997, the FWS noted that the slow decline was most dominant in the component of scoters observed in the WPUs composed of tundra habitat (Bristol Bay, Yukon Delta, Seward Peninsula, and Kotzebue Sound) (Conant and Groves 1997). This decline is due to a combination of factors including lead shot poisoning, contaminants in the food chain, and hunting. The 10-year average harvest of black scoter on the Yukon-Kuskokwim Delta is 6,100 compared to the most harvested species northern pintail at 9,600 and mallard at 6,800. Northern pintails and mallards have populations in Alaska of 946,000 and 836,100, respectively, while black scoter may number as low as 100,000-300,000 (Goudie et al. 1994, Bordage and Savard 1995, Conant and Groves 1998). Considering that black scoter harvest on the Yukon-Kuskokwim Delta is only slightly lower than harvest of northern pintails and mallards, species with nearly three times larger populations, a greater percentage of mortality in the black scoter population in Alaska may be attributed to hunting than in these other species.

Within the planning area, the surf scoter (*Melanitta perspicillata*) breeds along the western coast of Alaska from Kotzebue Sound to Wales (Savard et al. 1998). Kessel (1989) characterized them as uncommon summer visitors and rare breeders on the Seward Peninsula but locally common in Kotzebue Sound. These confirmed breeding areas may not represent the full extent of breeding distribution due to limited studies, difficulty in distinguishing between female surf and white-wing scoters when surveying, and the secretive breeding behavior of the species. Non-breeders and immature scoters summer along marine coasts in littoral areas, bays, and estuaries. Mixed flocks of males, non-breeders, and immatures occur on Kotzebue Sound throughout the summer but are rare in Norton Sound (Kessel 1989). They winter in coastal areas along the Aleutian Islands and south to Baja California. Aerial surveys in Alaska from

1957 to 1992 indicate long-term decline in breeding populations (Henny et al. 1995). Caution is required for interpreting trend data because surveys are not well adapted for estimating scoter numbers (Savard et al. 1998).

King eiders (*Somateria spectabilis*) occur within the planning area in low numbers (Map 3-16). These eiders are rare visitors to Seward Peninsula during the summer and winter, but may migrate through the area in large numbers (Kessel 1989). They breed along the Arctic coast from Cape Lisburne east to Canada (Suydam 2000) and are known to breed on Cape Thompson in the Maritime NWR. Kessel (1989) cites one breeding record for Cape Espenberg on the Seward Peninsula. Nesting occurs in a variety of tundra habitats. Distance from the coast varies, but the species commonly nests inland in areas of scattered lakes and ponds. They tend to nest farther inland than common or spectacled eiders. Molting areas are mostly unknown but are presumably in marine environments (Suydam 2000). During the summer, small groups of non-breeders molt in the Safety Sound-Cape Nome area and in the vicinity of Sledge Island (Kessel 1989). The species winters primarily in the Bering Sea, south of St. Lawrence Island, and along the coasts of the Aleutian chain (Suydam 2000). Based on migration counts at Point Barrow, the western Arctic population of king eiders appears to have declined by 55 percent between 1976 and 1996 (Suydam et al. 2000).

Bristle-thighed curlew (*Numenius tahitensis*) breeds on the north central Seward Peninsula and in the southern Nulato Hills and northern Yukon Delta, and is not known to breed outside of western Alaska (Marks et al. 2002) (Map 3-16). There are sporadic June records of individual birds in the Mulgrave Hills and western Baird Mountains north of Kotzebue, and small flocks of birds in late summer on the shores of Cape Krusenstern (Marks et al. 2002). Recent surveys of these locations during peak breeding failed to detect curlews (Marks et al. 2002). Curlews winter on islands in the Pacific Ocean. Primary staging area is the Yukon Delta with small groups staging along coastal areas of the Seward Peninsula (Kessel 1989). Nesting habitat is characterized by rolling hills covered with upland tundra, drainages with medium to tall shrubs, and higher elevation ridges and slopes with dwarf vegetation or bare ground. Comprehensive surveys of known breeding range from 1988 to 1992 yielded about 3,200 breeding pairs about 40 percent of which were on the Seward Peninsula (Marks et al. 2002).

Buff-breasted sandpiper (*Tryngites subruficollis*) is identified by Kessel (1989) as a very rare migrant on the Seward Peninsula and this status probably applies to the rest of the planning area as well. The primary breeding range of the species is the north slope of Alaska east of Barrow and into Canada. It winters in South America, apparently migrating north primarily along the central flyway through the United States and Canada. During the fall migration, some juveniles may migrate along the west coast of North America (Lanctot and Laredo 1994) and there are a few records of migrants on the Seward Peninsula in the spring and fall (Kessel 1989). This shorebird prefers dry ground on tundra ridges during breeding season and the drier areas of tidal flats during migration. Threats to the species range-wide include disturbance at nest sites, predation, contaminants, and loss or degradation of habitat along migration routes and in winter range (Lanctot and Laredo 1994).

Black guillemot (*Cepphus grylle*) is circumpolar in distribution. It is an uncommon breeder in western Alaska at Cape Thompson and a regular summer visitor to St. Lawrence Island with fewer than 2,000 breeding individuals found along the Alaska coast and offshore islands (Butler and Buckley 2002). This species is probably a rare visitor to the coastal portions of the planning area south of Cape Thompson (Kessel 1989). Guillemots generally breed along rocky marine coast of offshore islands in shallow water and forage in nearshore waters (Butler and Buckley

2002). They winter in marine habitats near the breeding range but retreat from areas of solid sea ice. Lack of historic data makes determination of any population trend difficult.

Red knot (*Calidris canutus*) breeds in northwestern and northern Alaska including the Seward Peninsula, De Long Mountains, and Point Barrow (Kessel 1989, Harrington 2001). Kessel (1989) characterizes the red knot as an uncommon breeder and fall migrant on the Seward Peninsula (Map 3-16). It nests in the upland areas on high, exposed ridges in dwarf shrub habitats. Red knots winter along the Pacific coastline from northern California to South America. Surveys conducted between 1989 and 2000 throughout the Seward Peninsula and eastern Baird Mountains show extensive nesting by knots that represent at least a few thousand nesting birds (Harrington 2001).

Arctic peregrine falcon (*Falco peregrinus tundrinus*) can be found in low numbers throughout the planning area, nesting in areas with suitable habitat and migrating throughout the region. Nesting habitat generally consists of bluffs or cliffs adjacent to water. Kessel (1989) characterizes the peregrine as a rare migrant and breeder on the Seward Peninsula. Checklists for NPS units and Fish and Wildlife Refuges within or near the planning area list the peregrine variously as a rare vagrant to an uncommon breeder. Peregrine falcons were listed as endangered in 1970. The Arctic peregrine was delisted in 1994 (Federal Register 1994). The ESA requires a minimum of five years of monitoring after delisting to ensure that species maintain a non-threatened status. Monitoring of Arctic peregrine indicates that populations have increased or remained stable since delisting (White et al. 2002).

Gray-cheeked thrush (*Catharus minimus*) is a common breeder throughout the planning area. It is one of the most common passerines on the Seward Peninsula (Kessel 1989). In Alaska, they favor habitats with a closed canopy of mid-sized shrubs with a dense woody undergrowth of dwarf shrubs. Suitable habitat occurs in a wide variety of habitats including riparian alder and willow thickets, open woodlands, scattered spruce forests near timberline, edge of coastal tundra, alder patches in tundra, and coastal hillsides (Lowther et al. 2001). This species is generally not found in habitats with shrubs less than 3.6 feet in height. They tolerate forest canopy if low shrub cover exists. Breeding bird survey data for gray-cheeked thrush shows that they occur primarily in upland tall shrub and riparian habitats on the Seward Peninsula (Cotter and Andres 2000). Little information is available on population status or trend in western Alaska.

Olive-sided flycatcher (*Contopus cooperi*) is an uncommon breeder in the coniferous forest of interior Alaska and may occur rarely on the eastern end of the Seward Peninsula (Kessel 1989). It probably occurs in low numbers in the forested regions on the eastern edge of the planning area (Map 3-17). Common features of nesting habitat are tall trees and snags often near water. This species is most often associated with forest openings and edges, or open to semi-open forest stands (Altman and Sallabanks 2000). In Alaska, they are frequently associated with relatively open boreal forest (Kessel and Gibson 1978). Over the past 30 years, the species has declined significantly throughout its range in North America. Breeding bird surveys indicate an overall annual decline of 3.9 percent from 1966 to 1996 (Altman and Sallabanks 2000). In Alaska, breeding bird survey data on olive-sided flycatchers is limited and consequently, no conclusive trend analysis is possible. However, the widespread negative trends detected elsewhere in this species' range certainly suggest that populations of this species in Alaska might be experiencing similar trends. Factors in the decline may include habitat loss or alteration in both wintering and breeding grounds, changes in availability of prey species, exposure to pesticides, and exclusion of fire (Altman and Sallabanks 2000). One of the flycatcher's primary wintering habitats, mature evergreen forests in the northern and central

Andes, is one of the most heavily altered habitats in South America. Andean valleys are almost completely deforested and 85 percent or more of the montane forests have been cut (Handel et al. 1998). These factors may be exacerbated by a very low reproductive rate

Blackpoll warbler (*Dendroica striata*) is a fairly common breeder within the eastern half of the planning area (Map 3-17). Kessel (1989) found that they were common on the eastern half of the Seward Peninsula. In the interior, they nest primarily in black spruce forest. In the western part of their range they occur regularly in spruce-alder-willow thickets in riparian areas or the transition between tundra and taiga (Hunt and Eliason 1999). On the Seward Peninsula they occur primarily in tall-shrub thickets of willow and alder (Kessel 1989). Breeding bird survey data for the western United States and Canada is not sufficient to determine trend because of remoteness of breeding habitat (Hunt and Eliason 1999).

McKay's bunting (*Plectrophenax hyperboreus*) winters in western Alaska along the Bering Sea coast from the Kotzebue area south to Cold Bay (Lyon and Montgomerie 1995) (Map 3-17). Most records are from mid-December to mid-March when they flock with snow buntings. They breed only on a few islands in the Bering Sea. They breed on vegetated and rocky tundra, especially on coastal lowlands. The species winters on beaches, open tundra, fields, or anywhere exposed vegetation is present (Handel et al. 1998). There are no known imminent threats to this species; however, its small population size and restricted range increases its vulnerability.

Canada lynx (*Lynx canadensis*) is the only indigenous wild cat of Alaska. Once found throughout northern North America, lynx are now federally listed as a threatened species in the northern Rocky Mountains of the Lower 48; consequently, BLM in Alaska considers the Canada lynx a sensitive species. In Alaska, Canada lynx are still considered a legal furbearer and are actively sought by trappers. Lynx are found throughout the planning area where suitable habitat and snowshoe hare populations exist. Lynx populations are inextricably dependent upon the availability the snowshoe hare, and to a lesser extent by the availability of other small game populations. Lynx inhabit Alaska's forested regions including spruce and hardwood forests from sea level to subalpine zones, but they fare especially well in areas that have recently experienced wildfires. In this mosaic habitat type of old black spruce forest and young resprouting vegetation, the prey species that lynx favor are more easily found foraging on the new, succulent growth (ADF&G 1994d). Canada lynx are present within Game Management Units 22 and 23 in small numbers, as indicated by the annual trapper interview/survey. No quantitative population information is available (Dau 2004b, Gorn 2004). Within Unit 22, lynx appear to be most abundant in Unit 22A. In Unit 22B survey respondents reported lynx were also common and numbers are likely increasing. Lynx are scarce, but probably increasing, in Units 22C and 22D (Gorn 2004). In Unit 23, lynx are found at moderate to high densities in localized areas with high snowshoe hare populations (Dau 2004b).

INSERT 11x17 MAP
**3_15_sss_te**

INSERT 11x17 MAP
**3_16_sss_waterfowl**

INSERT 11x17 MAP
**3_17_sss_passerine**

# *8. Fire Management and Ecology*

Fire is a very important natural mechanism of change in the planning area. Wildland fire is an essential ecological process that maintains and achieves vegetative desired conditions. The vegetation communities in the planning area have evolved with fire, giving those communities their current composition and structure. Many vegetative species are fire dependent or are in a "fire dependent ecosystem." While the distribution and dominance of a particular species in any given area may have changed as climate has fluctuated, fire-dependant species have been represented in the planning area for at least the last 6,500 years. Fire has been a mechanism of change from the time the boreal forest was established in its current form. There are also species of animals that prefer early and mid-seral stage forests.

## a) Fire History

A fire history dataset for the planning area is housed and updated yearly by the BLM's Alaska Fire Service. The dataset contains the perimeters for large fires reported by the BLM from 1950 to the current year. For fires for which no perimeter is available, the fire point of origin is annotated and the fire size noted in the dataset. Most of the missing perimeter maps are in the dataset for 1950 to 1987. This dataset includes fire perimeter maps for fires reported to be equal to and greater than 1,000 acres. For 1988 through the current year, the dataset contains wildland fire perimeters for fires equal to and greater than 100 acres. The reported numbers of wildland fires and acres burned in the planning area from 1950 to 2004 are 876 fires and 3.2 million acres, respectively (BLM 2005a) (Map 3-18).

## b) Fire Occurrence

The majority of the wildfires occurring in the planning area are caused by lightning. In mid-June through late July thunderstorms cross the planning area starting wildland fires when environmental conditions are right. Lightning can occur as early as April and as late as September, though 99 percent of all lightning strikes occur May through August, with 91 percent occurring in June and July.

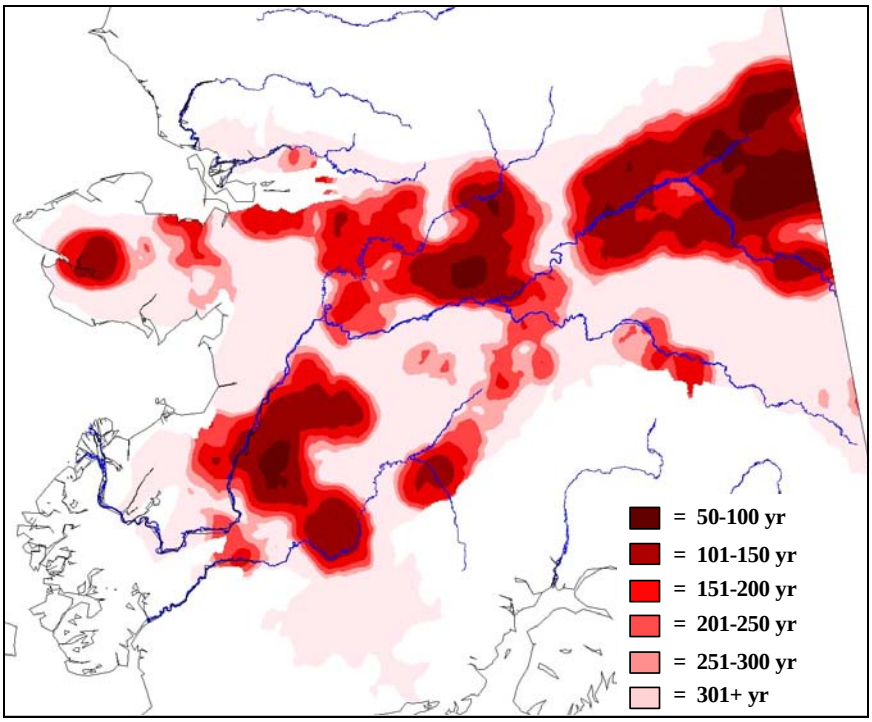
A total of 876 fires occurred in the planning area from 1950 to 2004. Of these fires, 412 had their point of origin on BLM-managed lands, and 89 were human-caused (the remaining 787 were lightning-caused). Of the 412 fires occurring on BLM-managed lands, only 20 were human-caused (BLM 2005a). Human-caused fires can occur any time an area is free of snow and environmental conditions are dry enough to sustain an ignition. Human-caused fires typically occur near villages and towns, along roads, or near rivers. Due to land ownership patterns, human-caused fires in the planning area rarely occur on BLM-managed lands.

## c) Fire Regimes

Fire Regime Condition Class (FRCC) is an standardized interagency tool for determining the degree of departure from reference condition vegetation, fuels, and disturbance regimes (Hann et al. 2003). The boreal forest has evolved and adapted to periodic wildland fires. Fire regime categories are based on natural conditions without influences by modern humans, and also

include the influences of aboriginal burning. Fire regime describes the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories are usually repeated, and the repetitions can be counted and measured (such as fire return interval). To comply with the national FRCC program requirements, the vegetation types in the planning area have been categorized into biophysical settings (BpS), described in Hann et al. (2003). Biophysical settings are the primary landscape delineations for determining the natural fire regime and fire regime condition class. These units are land delineations based on geographic area, physical setting, and vegetation community that can occupy the setting. Physical characteristics include climate, geology, geomorphology, and soils. Vegetation includes native species and successional stages found under the best understanding of the historic range of variation, including disturbances. In addition to these attributes, each biophysical setting also has distinct ecological processes associated with it (notably fire frequency, severity, and size) and hence provides a cogent, robust concept for displaying FRCC (Hann et al. 2003).

**Figure 3-1. Estimated Fire Return Intervals for Interior Alaska**




Source: Rupp 2002.

**Table 3-9. Fire Regimes in the Kobuk-Seward Peninsula Planning Area**

| Fire Regime | Frequency | Fire Type | Biophysical Setting |
|---|---|---|---|
| I | 0-35 years | Surface fire | None represented in planning area |
| II | 0-35 years | Stand replacement | None represented in planning area |
| III | 35-100+ years | Mixed | Persistent Shrub North |
| IV | 35-100+ years | Stand replacement | Black Spruce Interior |
| | | | Tussock Tundra 1 |
| | | | Dry Herbaceous Meadow |
| V | 200+ years | Stand replacement | Upland White Spruce Interior |
| | | | Riparian Spruce Hardwood |
| | | | Tussock Tundra 2 |
| | | | Dwarf Shrub Tundra |
| | | | Mesic Herbaceous Meadow |
| | | | Non-forested Wetland |

Source: Hann et al. 2003.

The vast majority of the planning area (approximately 90 percent) is in Fire Regimes IV and V (Table 3-9). The planning area is dominated by treeless vegetation types. The biophysical settings have been combined into three categories: Treeless Biophysical Settings, Black Spruce Interior, and Riparian Spruce Hardwood/Upland White Spruce. These categories are described in more detail below.

### *(1) Treeless Biophysical Settings*

There are several biophysical settings represented in the planning area that do not support trees, including Tussock Tundra 1, Tussock Tundra 2, Dwarf Shrub Tundra, Dry Herbaceous Meadow, Mesic Herbaceous Meadow, Persistent Shrub North, and Non-forested Wetland. These treeless types have surface fuels, an organic layer, and may have an associated shrub community. They tend to have deep organic layers at lower elevations and thinner organic layers at higher elevations. Though little is known about fire and its effects in these biophysical settings, fire is still an important mechanism of change in these areas. Fire recycles old vegetation and releases nutrients. Most of the fires occurring in these biophysical settings are stand replacing; however, they tend to burn in a mosaic pattern, leaving pockets of older vegetation interspersed within the burned areas.

These biophysical settings are found throughout the planning area. They dominate the foothills of the Brooks Range, the Brooks Range itself, the Arctic coastal plain, and the Seward Peninsula. In the planning area, these biophysical settings are found above treeline and in low-lying areas on poorly drained permafrost sites that are usually surrounded by black spruce.

For these biophysical settings, the estimated fire return interval increases as you move west and/or north in the planning area. It also increases as elevation increases. The only place this does not hold true is the interior portion of the Seward Peninsula, where the estimated fire return time is 35-100 years. The fire return on the Arctic coastal plain and in the Brooks Range is very long – measured in thousands rather than hundreds of years. Tussock tundra not on the Arctic coastal plain or at high elevation (Tussock Tundra 1) has a fire return of 35-100 years. The rest of the communities have long fire returns of 200+ years.

### *(2) Black Spruce Interior*

Black spruce is the climax indicator species and the dominate tree species in the Black Spruce Interior biophysical setting. It is found throughout the central and eastern portions of the planning area. It occurs primarily on poorly drained lowland sites or north facing slopes that are usually underlain by permafrost. It is usually associated with a feathermoss understory containing dwarf birch, Labrador tea, and other plants. There are some areas within the planning area that are an open woodland type of black spruce. In these areas lichens are the dominate understory species. The fire return interval in Black Spruce Interior is about 80-100 years.

### *(3) Riparian Spruce Hardwood/Upland White Spruce*

White spruce is scattered throughout the planning area along rivers and streams and in the uplands on south facing slopes. It occurs on warm well-drained sites or on depositional sites. It is also the treeline species in the northern parts of the planning area. It is usually mixed with one or more hardwood species. In the uplands, the dominate forest floor species are feathermoss with scattered herbaceous plants. In riparian areas, forest floor species are characterized by feathermoss, with a large amounts of alder, rose, equisetum, high bush cranberry, and other plants. The fire return interval is 150-200 years on upland sites and 300+ on riparian sites.

## d) Fuel Condition

Fire Regime Condition Class is further defined by a relative measure of the degree of departure from the natural fire regime. There are three classes of departure (the condition class) for each fire regime. Condition Class 1 is defined as being within the natural range of natural variability of vegetation characteristics. Condition Class 2 is a moderate departure from the natural fire regime, and involves a moderate risk of losing key ecosystem components. In this class the fire return intervals have departed from natural frequencies by one or more return intervals. This can be either an increase or decrease in the fire frequency. There are moderate changes in one or more of the following ecological components: vegetation characteristics, fuel composition, fire type, or other associated disturbances. Condition Class 3 is a high departure from the natural fire regime. In this class fire regime has been substantially altered from its natural range and there is a high risk of losing ecosystem components. Fire frequencies have departed from natural frequencies by multiple fire return intervals. Dramatic changes can occur in one or more of the following ecological components: vegetation characteristics, fuel composition, fire type, or other associated disturbances.

## e) Fire Behavior

In Alaska, the BLM uses the Canadian Forest Fire Danger Rating System (CFFDRS) for both fire danger and fire behavior predictions. This system is a seamless system that addresses organic layer consumption. The vegetation in the planning area has been classified into established CFFDRS fuel types: Spruce Lichen Woodland (C-1), Boreal Spruce (C-2), Boreal Mixedwood, (M-1/M-2) and Matted or Standing Grass (O-1). M-1 and M-2 are the leafless and green stages of the boreal mixwood fuel type. There are two grass types contained in O-1: Matted grass (O-1a) and standing grass (O-1b). Within this analysis, no distinction is made between the standing and matted grass fuel types (Map 3-19 and Table 3-10).

**Table 3-10. Fuel Types in the Planning Area**

| Fuel Type | Code | Percent of Planning Area in Fuel Type | Fire Intensity |
|---|---|---|---|
| Matted or Standing Grass | O-1 | 91.5 | Generally low to moderate |
| Boreal Spruce | C-2 | 4 | Often moderate to extreme |
| Spruce Lichen Woodland | C-1 | 3.5 | Generally moderate to high |
| Boreal Mixedwood | M-1/M-2 | 0.1 | Low to moderate |
| Water, glaciers, and snowpack | N/A | <1.0 | None |

### *(1) Matted or Standing Grass – O-1*

The planning area is dominated by the O-1 fuel type. Approximately 91.5 percent of the planning area is represented by this fuel type. The fire behavior would usually be described as low to moderate burning intensity with low to moderate rates of spread and flame lengths. However, under extended drought conditions with strong winds and low relative humidities, this fuel type can exhibit high to extreme rates of spread and high intensity burning. Tussock tundra communities may burn with a higher intensity, rate of spread, and flame length if there is a large component of dead standing grass contained within them. The severity of burn depends on the amount of moisture in the organic layer. Most fires will be low severity surface fires; however, long period of dry conditions can produce fires that remove some to the entire organic layer, resulting in moderate to high severity fires.

### *(2) Boreal Spruce – C-2*

A little more than 4 percent of the planning area is in C-2 fuel type. This is the most volatile and problematic fuel type in the planning area. Found mainly on the Selawik NWR, this fuel type is made up of moderate to very dense stands of black spruce with a very deep organic layer. It usually has a large component of volatile shrub species, such as dwarf birch or Labrador tea in the understory. Organic layer depth is usually around one foot, but can be as deep as two feet. This fuel type routinely exhibits moderate to extreme burning intensities and flame lengths, and moderate rates of spread. The fuel type burns as a dependant crown fire and almost always has a portion to the entire canopy involved. While it does not exhibit the extreme rates or spread of the grass fuel models, it will move at speeds up to two miles an hour. Combined with the intensities and flame lengths generated, this fuel type can be very volatile even under what would otherwise be considered moderate environmental conditions. Upland white spruce is also placed in this fuel type. While it does not burn as often and needs drier condition to burn, it may exhibit the same extreme fire behavior as black spruce. Fires in riparian white spruce are very rare; during most burning conditions these communities slow the fire's progress. To burn, white spruce require extreme drought or stand degradation due to disease or over maturity.

### *(3) Spruce Lichen Woodland – C-1*

The C-1 fuel type is the less volatile cousin of the C-2 fuel type. It has a black spruce component with the trees more widely scattered and the organic layer shallower than in the C-2 fuel type. The organic layer is commonly two to four inches in depth. It usually does not have the volatile shrub species in its understory. About 3.5 percent of the planning area is the C-1 fuel type. This fuel type is found in the southern portions of the Seward Peninsula and the western Kobuk Valley. It exhibits moderate to high burning intensities and flame lengths and

will generate slightly faster rates of spread than the C-2 fuel model. Rates of spread are moderate to high. It will also involve the crown, but because of fewer trees, the intensities and flame lengths are lower than in the C-2 type. Fires also range in severity from just surface fuel consumption to severe fires that consume the entire organic layer.

### *(4) Boreal Mixedwood – M-1/M-2*

Less than 0.1 percent of the planning area is in the M-1/M-2 fuel type, a mix of hardwoods and spruce. Hardwoods found with white spruce are either aspen or birch. Aspen and black spruce can be found on colder sites. Surface fuels are primarily leaf litter. This fuel type is prone to surface fires before green-up. Early season fires may or may not kill the trees. In late summer when drought conditions exist, fires have a smoldering phase that consumes the entire organic layer after the surface fire passes. These fires usually kill and tip over all the trees in the fire area. Fires do not burn in this fuel type after green-up or when drought conditions are absent, and during these conditions, boreal mixedwood areas may be used as safety zones for firefighters. Within the planning area, this fuel type is only found on the Selawik NWR.

The remaining 1 percent of the planning area is made up of non-burnable areas of water, glaciers and permanent snowpack.

## f) Fire Policy

The overriding priority for all wildland fire actions in the planning area is firefighter and public safety. If an action on a wildland fire endangers firefighters or the public and cannot be mitigated, it will not be carried out. Once people have been committed to an incident, these human resources become the highest value to be protected.

DOI Departmental Manual 620, Wildland Fire Management (DOI 1998), directs the BLM to provide fire suppression services on all DOI-managed and Native lands within Alaska. The BLM has implemented this direction by creating the Alaska Fire Service (AFS). AFS is authorized to provide safe, cost-effective emergency wildland fire suppression services in support of management plans on DOI-administered land and on those lands that require protection under ANCSA, as amended. AFS executes these services within the framework of approved fire management plans or within the mutually agreed upon standards established by the respective land managers/land owners (DOI 1998). Fire suppression operations within the planning area are the responsibility of the AFS Galena Zone Fire Management Officer. The Galena Zone is headquartered in Galena during the fire season, and is housed on Fort Wainwright the rest of the year.

All other fire management activities such as fire planning, education and prevention, use of prescribed fire, establishing emergency suppression strategies, and setting emergency suppression priorities are all the responsibility of the Fairbanks District Office. The Fairbanks District Office maintains the overall fire management responsibility and accountability for activities occurring within the planning area (DOI 1998).

Fire is an essential mechanism of change in the boreal forest resulting in multiple resource benefits. The current policy for the planning area is application of the appropriate management response considering firefighter and public safety, resources benefits, values at risk, and suppression cost. The current policy does not distinguish between any naturally-occurring fires.

The Northwest Management Framework Plan (MFP) (BLM 1982) contains little guidance on fire management. There are no fire management goals or objectives, and there is only one decision about wildland fire suppression: "Allow fire under prescribed conditions." The rationale for this decision is that, "[f]ire suppression cost frequently exceeds the value of resource values protected. Fire management plans which consider both positive and negative effects of fire must be developed within constraints of the Departmental policy." The MFP makes one recommendation regarding wildland fire and fuels management, and that is to: "[a]llow fire under prescribed conditions," with the rationale of, "[b]y allowing natural or prescribed fires to burn, it may be possible to reduce suppression costs while providing benefit to wildlife." The MFP contains no guidance on fire prevention.

In order to comply with the National Fire Plan and the 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (IFWFPR Working Group 2001), the BLM amended the fire management direction in the Northwest MFP in July 2005. The Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004b, 2005c) identifies land use and resource objectives, wildland fire suppression options, and fuels (vegetation) management activities that achieve those objectives. The amendment is applicable to all BLM-managed lands in Alaska until such time as new RMPs are completed. Fire management options emphasize the protection of human life and site-specific values and also recognize fire as an essential ecological process and natural change agent of the Alaskan ecosystems. Firefighter and public safety are identified as the number one priority in all fire management activities. The amendment also reinforces BLM-Alaska's commitment to support the interagency wildland fire program, consider the latest available technology and methods, and support scientific research to study fire effects and improve business practices.

Between 1980 and 1988, the BLM participated with other Federal and State land management agencies and Native groups in completing 13 interagency fire management plans. Alaska interagency fire management plans for the following planning areas are applicable to this RMP:

- Alaska Interagency Fire Management Plan: Kobuk Planning Area (1984)
- Alaska Interagency Fire Management Plan: Seward/ Koyukuk Planning Area (1984)
- Alaska Interagency Fire Management Plan: Yukon/Togiak Planning Area (1984)
- Alaska Interagency Fire Management Plan: Arctic Slope Planning Area (1986)

This set of plans provided a statewide, coordinated, cost-effective, landscape scale approach to fire management. Each plan contains a description of the local environmental and socioeconomic conditions, natural and cultural resources, fire history and behavior, and local subsistence activities. The plans also provided a consistent interagency approach to operational procedures and the identification and prioritization of values-to-be-protected. The four management options defined in the plans (Critical, Full, Modified, and Limited) are flexible enough to allow different agencies to manage fire on their lands according to policies and mandates exclusive to their agencies.

In 1998 the 13 original plans were consolidated into one document, the Alaska Interagency Wildland Fire Management Plan (AIWFMP 1998). This consolidated plan updated language in the original plans, eliminated the boundaries of the 13 original plans, and combined common elements into a single operational document. Area-specific documentation still resides in the original planning documents.

To meet Federal fire planning requirements, comply with 2001 Federal fire policy, and address national fire program analysis requirements, BLM-Alaska completed its Wildland Fire

Management Plan in September 2005 (BLM 2005m). This plan is based on the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004b, 2005c), the Alaska Interagency Wildland Fire Management Plan (AIWFMP 1998), and the policies and standards outlined in the 2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (IFWFPR Working Group 2001).

The four management options (defined in Table 3-11 and displayed on Map 3-20) defined in the original interagency fire management plans and further described in the Alaska Interagency Wildland Fire Management Plan (1998) and the BLM's Wildland Fire Management Plan are utilized statewide by all Federal, State, and Native land managers. Options are assigned on a landscape scale across agency boundaries. BLM Field Office staffs have selected management options based upon an evaluation of their legal mandates, policies, regulations, resource management objectives, and local conditions. Local conditions include but are not limited to population density, fire occurrence, environmental factors, and identified values. Fuel type, access, topographic features, fire regime and political boundaries are considered for determining management option boundaries but are not necessarily determining factors for landscape scale management option designations. The intent in assigning these management options is to have designations that are ecologically and fiscally sound, operationally feasible, and sufficiently flexible to respond to changes in objectives, fire conditions, land-use patterns, resource information, and technologies. The designation of a management option pre-selects initial strategies (appropriate management response) to a wildland fire; responses range from immediate and aggressive suppression to periodic surveillance. The map atlas at the local fire suppression office and the Alaska Interagency Coordination Center is the official record that delineates fire management option boundaries and site-specific designations. AFS maintains the statewide management option data and an updated GIS file is available annually by May 1. BLM Field Office staffs are responsible for updating and reviewing management option and site designations annually. More detailed policy, objectives, operational considerations, operational procedures and other information for each fire management option are contained in the Alaska Interagency Wildland Fire Management Plan (1998).

**Table 3-11. Fire Management Options**

| Fire Management Option | Intent | Management |
|---|---|---|
| Critical | Protect areas where there is a threat to human life, inhabited property, designated physical developments, and structural resources designated as National Historic Landmarks. | Highest priority for assignment of available suppression resources to exclude fire from the area or site. |
| Full | Protect cultural and historical sites, uninhabited private property, natural resource high-value areas, and other high-value areas that do not involve the protection of human life and inhabited property. | Priority is below Critical for available suppression resources to suppress fires at the smallest reasonably possible acres. |
| Limited | Allow fires to burn under the influence of natural forces within predetermined areas to accomplish land and resource management objectives. Estimated costs of suppression efforts are a factor. | Surveillance to observe fire activity and to determine if site-specific values or adjacent higher priority management areas are compromised. Site-specific actions when necessary to protect human life and site-specific values. |
| Modified | Balance acres burned with suppression costs and accomplish land and resource objectives. Strategies are based on an annual conversion date. | Priority for assignment of available suppression resources is below Full. Suppression efforts vary: when risks of large fires are high, the initial response to a fire is analogous to Full without the intent to minimize acres but to balance acres burned with suppression costs. When the risks are low, the appropriate response to a wildland fire is analogous to Limited. |

Option designations are based on the land manager and landowner(s) values to be protected as well as land and resource management objectives. These management strategies are currently implemented in the planning area. Management options are reviewed yearly and adjustments are made to ensure resource goals and objectives are being met.

**Table 3-12. Current Fire Management Options in the Planning Area**

| Fire Management Option | Acres of Total Lands in Management Option | Acres of BLM Lands in Management Option | General Description of Lands |
|---|---|---|---|
| Critical | 32,000 | 1,074 | Majority is in and around villages; under the ownership of village and regional corporations; protects areas of human habitation |
| Full | 2,000,000 | 466,000 | Majority surrounds critical management option areas near villages; ownership of those lands is mostly village and regional corporations; high resource values. |
| Modified | 13,200,000 | 3,200,000 | Low resource value; surrounds Full option; few values at risk |
| Limited | 15,100,000 | 7,500,000 | Low resource value; areas where fire is considered beneficial; few values at risk |

In order to prioritize assignment of suppression forces and determine the appropriate actions to be taken within the landscape-scale management option classifications, site designations of Critical, Full, Avoid, and Non-sensitive have been established for structures, cultural and paleontological sites, small areas of high resource value, and threatened and endangered species habitat in order for the resource staff to give suppression agencies more specific guidance for small sites.

Sites designated as Critical and Full are to be protected from degradation from fire and are prioritized in a manner similar to landscape scale designations. A Critical site is either a national historic landmark or a permanent year-round residence. A site can be designated Full if it meets one or more of the criteria listed in the BLM Policy for Structure Protection (Appendix E).

Sites designated as Non-sensitive are acknowledged as known to BLM staff, but require no additional suppression efforts or restrictions. A Non-sensitive site is a site the Fairbanks District Office has decided, through application of policy, not to protect. A Non-sensitive designation does not warrant risks to firefighters.

Sites designated as Avoid are areas where fire suppression efforts should be avoided and effects from suppression efforts minimized. All aircraft should be restricted from these areas. An Avoid site may identify endangered species or their habitat or a prehistoric site. Fire suppression activities at these sites would be detrimental to the values associated with each site.

These four categories of sites receive protection priority as would a fire in one of the Fire Management Options. Critical sites are the first priority for protection, while Full sites are second priority. No protection is afforded Non-sensitive or Avoid sites. There is no Site Designation that corresponds to the Modified or Limited Fire Management Option, though any of the four Site Designations may be located within any of the four Fire Management Options (e.g., a Critical Site Designation located within a Limited Fire Management Option, or an Avoid Site Designation within a Critical Fire Management Option).

Designations are recorded on the map atlas in the fire dispatch office; it is the joint responsibility of the BLM Field Office staff and the suppression staff to keep the atlas current. Site designations are subject to annual review and updating. When a structure is discovered during fire management activities, the Field Office representative is notified immediately. Under normal circumstances during suppression operations, the suppression agencies are not responsible for and will not provide protection to unauthorized structures unless they meet one or both of the following criteria:

- It is necessary to preserve structures to save human life.
- The structure is evaluated and determined to be eligible for consideration for the National Register of Historic Places.

The BLM Policy for Structure Protection (Appendix E) serves as guidance to AFS and the Alaska Division of Forestry concerning structure protection priorities in relation to wildland fire monitoring and suppression activities on BLM-managed lands in Alaska. As with all other aspects of fire management, safety of fire suppression personnel and the public is the number one priority of the policy. The policy provides criteria for protection of all structures, and criteria for establishing historic value for structures if those values had not been determined prior to a fire event.

Under the authority granted by ASS 41.15.010, the State is responsible for determining the Fire Management Option and Site Designation (i.e., the protection level) for inholdings or lands adjacent to BLM-managed lands that are fee simple titled (i.e., private property). The BLM sets the protection level of private possessions (cabins or personal belongings) of BLM permit holders or other occupants on public land managed by the BLM.

The BLM's fire trespass procedures in Alaska follow the interim guidance in the Draft Fire Trespass Handbook issued in August 2005 (BLM 2005d) and are supplemented by the BLM Alaska State Fire Trespass Operating Plan (BLM 2005b). AFS is responsible for notifying the Field Office immediately when a fire is suspected of being human-caused; the Field Office is responsible for investigation and case pursuit. At the Field Office staff's request, AFS may assist or facilitate an investigation. AFS maintains fire records, tracks associated fire costs, and produces a final fire cost for each fire.

## g) Fuels Management

No prescribed burns or other fuels treatment projects have been implemented in the planning area on BLM-managed lands, nor are any fuels treatment projects currently being planned. Manual, mechanical, and prescribed fire projects are allowed in the planning area to either protect natural, biological, or cultural resources or to meet the desired future condition of any natural or biological resource. Fuels treatment projects require activity level plans and an environmental analysis. An ANILCA Section 810 analysis may also be appropriate. At present, Wildland Fire Use is permitted in the planning area, but has not been implemented.

## h) Smoke Management

Alaska Department of Environmental Conservation (ADEC) is responsible for declaring air episodes and issuing air quality advisories, as appropriate, during periods of poor air quality or inadequate dispersion conditions. ADEC is a member of the Alaska Wildland Fire Coordinating Group. During periods of wildland fire activity, the Multi-agency Coordinating Group, a sub-group of the Alaska Wildland Fire Coordinating Group, addresses air quality and smoke management issues. As ADEC develops a State Implementation Plan for regional haze, changes may be necessary to address additional fire tracking and emission management needs based upon policies and guidelines developed by the Western Regional Air Partnership. Under State law, all agencies, corporations, and individuals that burn 40 or more acres of land require written approval from ADEC prior to burning. The Enhanced Smoke Management Plan being developed by ADEC will outline the process and items that must be addressed by land management agencies to help ensure that prescribed fire activities minimize smoke and air quality problems. The Enhanced Smoke Management Plan will also address elements required by the EPA's Interim Air Quality Policy on Wildland and Prescribed Fire (EPA 1998).

## i) Fire Prevention

Human-caused fires are not a significant problem in the planning area in that they do not occur with much frequency. Of the 876 fires that have occurred between 1950 and 2004, only 89 were caused by humans. Most human-caused fires occurred near villages and towns. Only 20 human-caused fires have occurred on BLM-managed lands since 1956 (BLM 2005a). A rural Alaska version of the Firewise program is currently being developed by an interagency group

and will be distributed to the villages and towns in the planning area upon completion. There is no prevention plan for the planning area at this time. Should human-caused fires begin increasing in frequency, an activity plan would be developed to address human-caused fires.

INSERT 11x17 MAP
**3_18_fire_history**

INSERT 11x17 MAP
**3_19_fire_fuels**

INSERT 11x17 MAP
**3_20_fire_mgt**

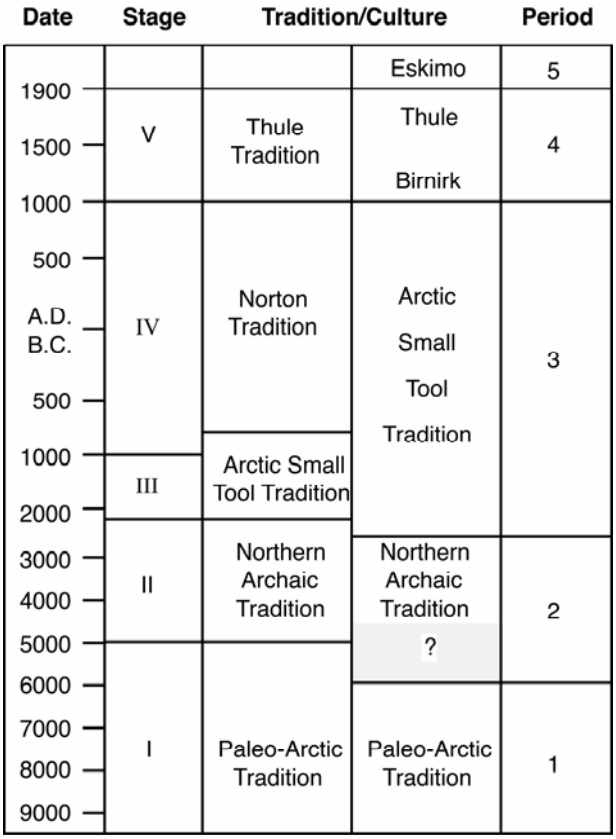
# 9. *Cultural Resources*

## a) Prehistory

There are many unknowns in Alaskan archaeology, but enough is currently known about northwest Alaska that there is a generally accepted cultural chronology for the region. There are some differences between the northern part of the planning area and the Seward Peninsula, but this chronology can nonetheless provide a framework for understanding the prehistory of the area.

Anderson (1984) and Dumond (1984) present similar formulations of this sequence, the former for northern Alaska and the latter for the Bering Sea area. A composite of the two chronologies is shown in the figure below.

**Figure 3-2. Cultural Chronology for Northwest Alaska**




Source: derived from information in Anderson (1984) and Dumond (1984).

### *(1) Paleo-Arctic Tradition*

The earliest archaeological sites known to occur in the planning area are assigned to the Paleo-Arctic Tradition, first defined from Onion Portage, a large stratified site on the Kobuk River (Anderson 1970). There are only a few sites within the planning area that can be securely assigned to this period, and none of them are located on BLM-managed lands. There are few known Paleo-Arctic sites in Alaska, so it is very difficult to describe the way these people lived. Anderson (1984) sees this period as one in which people were primarily adapted toward tundra hunting. The Paleo-Arctic Tradition spans a period of 3,500 to 4,500 years, from about 9500 BC to 5000-6000 BC, as shown in the previous figure.

### *(2) Northern Archaic Tradition*

The next defined tradition in northwest Alaska is the Northern Archaic, based on morphological similarities with artifacts from outside of Alaska. The relationship of this tradition to the earlier one is not clear, but the Northern Archaic is often interpreted as representing the movement into Alaska of new peoples at about the same time as the boreal forest spread into new areas of the state. As with the earlier Paleo-Arctic Tradition, there is only limited information on how these peoples lived.

There are only a few sites belonging to the Northern Archaic Tradition in the planning area; all of them in the northern portion of the area, and none of them on BLM-managed lands.

### *(3) Arctic Small Tool Tradition/Denbigh Flint Complex*

The next entity in the chronology of northwest Alaska is the Arctic Small Tool tradition, which is characterized by some of the finest stone tools known from the state. In Anderson's formulation the tradition spans the period between about 2500 BC and AD 1000, and begins with the Denbigh Flint Complex which is followed by Choris, Norton, and Ipiutak (1984).

Dumond (1984), on the other hand, defines a much briefer Arctic Small Tool Tradition, lasting from just before 2000 BC to a little after 1000 BC. In Dumond's formulation, the Arctic Small Tool tradition consists only of Denbigh, and subsequent materials are classified as a separate Norton tradition.

In any case, the Arctic Small Tool tradition first appears about 2500 BC, is widespread in Arctic and subarctic North America, and represents the first extensive occupation of Arctic regions in the new world (Dumond 1984).

The Denbigh Flint Complex was first defined from excavations at Cape Denbigh (Giddings 1964), on Norton Sound, and has also been discovered at the Cape Nome site (Bockstoce 1979), Cape Espenberg (Giddings and Anderson 1986), and from the Choris type site, just north of the Seward Peninsula (Giddings and Anderson 1986). Schaaf (1988) reports locating a Denbigh site near Kuzitrin Lake in the interior of the Seward Peninsula.

Little is known about Denbigh Flint Complex peoples. The number of Denbigh sites that have been excavated is small, and artifact collections have mostly been limited to stone implements and detritus. Nevertheless, the locations of known sites and the types of artifacts recovered indicate a people that were at home on both the coast and in the interior, and who hunted marine mammals and caribou. At present, known coastal sites appear to be seasonal, probably

spring hunting camps, and it is presumed that Denbigh peoples spent most of the year in the interior (Giddings 1964, Giddings and Anderson 1986).

### *(4) Arctic Small Tool Tradition/Norton Tradition*

A people whose artifacts bear strong resemblances to those of Denbigh occupied western and northern Alaska followed the Denbigh Flint Complex. As mentioned above, there is disagreement as to the degree of continuity between Denbigh and the subsequent cultures. There is also a difference in the terms applied to the cultures. South of the Seward Peninsula the term "Norton" has been applied to the entire sequence, and the archaeological remains are generally seen as more homogenous than in the north. In the north, the sequence has long been divided into three separate cultures labeled "Choris," "Norton," and "Ipiutak."

Whatever terms are applied, beginning about 1500-1000 BC the area was inhabited by peoples who appear to be more oriented toward the coast and marine resources than were the Denbigh peoples. Large coastal villages have been discovered at Cape Nome, at Point Hope, and near Unalakleet, and smaller winter settlements are also known from the Choris Peninsula.

We know much more about the peoples of this period than we do about those from the earlier Denbigh/Arctic Small Tool tradition period. Not only have several houses been excavated, but the archaeological record for these peoples is richer and more extensive. They are represented not only by stone implements and their by-products, but also by a range of organic tools and faunal remains, which allow a fuller picture of the lives of the people who made them.

During this period we see the first large winter coastal settlements, and faunal remains and artifact types document the importance of marine resources. This period also sees the first evidence of fishing as an important subsistence activity, although it may become much less important during the later part of the period. Peoples of this period made pottery and carved implements of bone, antler, ivory, and wood. Houses were of several different forms, but were all semi-subterranean pit houses similar in many respects to those known from historic Eskimo settlements. Villages seem to have been located mostly in coastal areas, with short-term use of the interior, primarily for the hunting of caribou. In many respects, the peoples of this period appear very similar to modern Eskimo cultures in terms of their subsistence and settlement patterns.

### *(5) Birnirk*

At the end of Norton times there appears to have been a period during which no one inhabited the coastal areas of northwest Alaska, or at least not in numbers sufficient to leave a significant archaeological record. At least one author has interpreted this hiatus as the result of climatic changes that reduced or eliminated salmon runs followed by a decline in the caribou herds (Bockstoce 1973, 1979:90). Following the break in the archaeological record, a new culture, referred to as Birnirk, appears at scattered locations in northwestern Alaska. Bockstoce interprets the distribution of Birnirk sites as an indication that Birnirk peoples specialized in the hunting of marine mammals, and suggests that improved harpoon technology, especially use of the inflatable float, gave them the ability to exploit these resources more efficiently than Norton peoples (Bockstoce 1979:91-92).

### *(6) Thule*

The marine mammal hunters of Birnirk were followed by the Thule culture, clearly antecedent to modern Eskimos, and possibly developing out of Birnirk. In the years after about AD 1000 the people of this tradition spread quickly across Arctic Alaska, Canada, and into Greenland, and also along the subarctic Bering Sea coasts of Alaska. Thule peoples continued the strong orientation toward marine resources that characterized their predecessors. Whaling was an important subsistence activity in many coastal areas, and the hunting of smaller sea mammals and caribou continued. In certain areas, notably the Kobuk River and the central Brooks Range, subsistence patterns developed that were more dependent on inland resources such as salmon and caribou.

Over time, local variations developed in groups belonging to the Thule tradition. At the Nukleet site at Cape Denbigh, Giddings excavated remains that document more or less continuous occupation from the twelfth to the eighteenth centuries, and which show a subsistence pattern involving roughly equal reliance on sea mammals, fish, and caribou (Giddings 1964). Bockstoce (1979) hypothesizes a similar pattern at Cape Nome, but with greater use of walrus and less of beluga and birds.

In general, it appears that Thule times represent the spread of mostly coastal-oriented peoples into what was largely unpopulated portions of the Arctic and subarctic, followed by adaptation to local conditions. This trend continued until the historic period when contacts with European and American culture initiated major changes in the cultures of the region.

## b) History

It is useful to organize the history of the planning area into three general periods based primarily on the nature of contacts between Euroamericans and Alaska Natives. The first period lasted from about 1732 to 1850, and was characterized by a few short visits by Euroamerican explorers. The second period, from about 1850 to 1900, involved more extensive contact as ships began to overwinter in the area and non-Alaska Natives began to be present for extended periods of time. The final period, from about 1900 on, is the post-gold-rush era, characterized by permanent Euroamerican settlements and more or less continual interaction between the two cultures.

### *(1) Early Contact*

Vitus Bering is often credited with “discovering” Alaska and the strait that bears his name, but the inhabitants of Siberia had considerable knowledge of Alaska prior to Bering’s voyages. The primary source of this knowledge was the Chukchi peoples of Siberia, who interacted with the Eskimo inhabitants of Alaska through trade and warfare (Ray 1975).

Trade was an important aspect of life in aboriginal Alaska, and an important trade fair was held on a regular basis in the Kotzebue area. Groups from as far away as the Diomede Islands and the north slope of the Brooks Range would travel to the Kotzebue area for the trade fair (Spencer 1959).

The first recorded non-aboriginal visit to any location within the planning area occurred in 1732 when the Russian explorers Mikhail Gvozdev and Ivan Federov landed on Alaskan soil, probably somewhere near Cape Prince of Wales (Holland 1994).

Captain Cook visited the area in 1778, exploring Norton Sound, naming several geographic features, and noting a small village, probably at the mouth of the Kwik River just west of Bald Head (Ray 1975). Cook's party traded for food with Alaska Natives near Bald Head and Cape Denbigh, leaving the area after a stay of about 10 days.

Two explorers passed through the Bering Strait area in 1791. Ivan Kobelev visited the Diomede Islands, Wales, and King Island in June, and an expedition in the charge of Joseph Billings visited Cape Rodney, about 40 miles northwest of Nome, in July (Ray 1975). The Billings expedition produced the first detailed recorded description of the inhabitants of the area.

In 1816 the Russian Otto von Kotzebue visited the planning area, “discovering” Shishmaref Inlet and continuing into Kotzebue Sound. The expedition named several features in the area, including Cape Espenberg, Eschscholtz Bay, and Cape Krusenstern (Holland 1994).

Another explorer who visited the area during this earliest period of contact was Frederick William Beechey, who arrived in Kotzebue Sound in July 1826 on HMS *Blossom*, intending to meet with an overland expedition led by Sir John Franklin. Members of the crew explored the area, naming Hotham Inlet and recording the Buckland River. In 1827 the Beechey expedition visited the west coast of the Seward Peninsula, visiting Cape Rodney, and “discovering” Port Clarence and Grantley Harbor (Ray 1975).

### *(2) Sustained Contact*

Contacts between Euroamericans and Alaska Natives increased after about 1850. In 1848 Thomas Roys became the first whaler to pass through the Bering Strait and to take whales in the Chukchi Sea (Bockstoce 1986). The success of this voyage led almost immediately to the era of Arctic Whaling, and by 1851 some 250 ships had been involved in hunting whales in northern Alaska waters (Ray 1975). Whalers had a significant impact on the Eskimos of the North Slope, but mostly passed through the Bering Strait area without much contact until they began using steam ships. In 1884 a coaling station was established at Point Spencer, and following that, a number of steam whaling ships would gather each summer to meet ships bringing supplies to the fleet. This drew Eskimos from the surrounding area who gathered to trade with the whalers (Ray 1975).

In 1845 Sir John Franklin with two ships, the HMS *Erebus* and *Terror*, was sent by the Admiralty to explore the Canadian Arctic for the Northwest Passage. The expedition disappeared with its entire complement of nearly 130 men. Between 1847 and 1880 numerous search parties were sent to the Arctic to try to locate the Franklin expedition or evidence of their passing (Holland 1964). Several of these parties visited the Bering Strait region, in the hope that Franklin might have successfully navigated the Passage, resulting in a sustained presence in northwest Alaska between 1851 and 1854. Ships sailed into Kotzebue Sound and the Norton Sound area, and several ships spent the winter at Port Clarence (Ray 1975). In 1851 a party traveled overland from the *Plover* at Port Clarence to St. Michael, passing through Fish River, Golovnin Bay, and Shaktoolik, and returning by way of Egavik, Shaktoolik, Golovin, White Mountain, Casedepaga, and Kauwerak (Ray 1975). In 1853 a small party from the supply ship *Rattlesnake* made the trip from Port Clarence to Kotzebue Sound, producing the earliest recorded account of people in the interior of the Seward Peninsula (Ray 1975).

In the years 1865-1867 the attempt to construct a telegraph line across Alaska and the Bering Strait resulted in additional contacts. Although ultimately unsuccessful, the attempt produced

the first Euroamerican settlements in the planning area. Base camp for the telegraph expedition was first established in St. Michael in 1865, with a smaller group established at Port Clarence in 1866 (Ray 1975). This Port Clarence group was under the command of Daniel B. Libby (Ray 1975). A party associated with the telegraph expedition is credited by Brooks (1908a) with the first significant inland exploration and with the discovery of gold on the Niukluk River.

Beginning in 1879 and continuing well into the twentieth century, the U.S. Revenue Marine Service began regular patrols of Alaskan waters. The purpose of the voyages was to watch over trade with Alaska Natives and to provide aid to commercial vessels in the event problems developed. For much of this period the cutter *Bear* and its captain Michael A. Healy became frequent visitors to ports on both sides of the Bering Strait (Holland 1994).

The initial discovery of gold on the Seward Peninsula in the 1860s produced no rush to the north, and in fact appears to have had no immediate effect on the history of the area at all. Indeed, the first attempts to extract minerals from the Seward Peninsula had nothing to do with gold or the Niukluk River, although they would occur in the same general area. In 1880 reports of rich silver ores from the Omilak Mine near the Fish River were published in San Francisco, and in 1881 a small mining company was formed to exploit them (Ray 1974). Over the next decade several attempts were made to develop a mine at Omilak, none of them very successful. Only a few hundred tons of ore were ever mined, and some of this never made it to market as a result of ships going astray (Ray 1974).

One employee of the Omilak silver mine was to play a role in the subsequent history of the region, however. John Dexter began prospecting on the Niukluk River in 1891 and continued in 1892. He established a trading post at Cheenik on Golovnin Bay, and supported at least one other prospecting effort into the Niukluk River (Castle 1912). Although these various expeditions are reported to have resulted in the discovery of gold, the discoveries were apparently not significant enough to justify further development. Dexter's trading post developed into something of a center for developments in the region, and a Swedish Evangelical Mission and Protestant Episcopal Mission were both established there.

Exploration continued during this period, one significant example being the parties led by George Morse Stoney in 1883 through 1886. Stoney explored the length of the Kobuk River, wintering in 1885-86 at a place he named Fort Cosmos. During that winter parties from Fort Cosmos explored a large area in northwest Alaska, including the Kobuk, Noatak, upper Alatna, and upper Colville rivers, and much of the surrounding terrain (Holland 1994).

### *(3) Intense Contact*

Significant quantities of gold were discovered in the interior of the Seward Peninsula in 1898, leading to the establishment of Council and the beginnings of the rush to the region. After 30 years away from Alaska, Daniel Libby returned to the area in 1897, intent on relocating the streams where he had seen gold during his days with the telegraph expedition (Cole 1984). With his three partners, Louis Melsing, H. L. Blake, and A. P. Mordaunt, he arrived at Dexter's trading post in the fall of 1897. By spring of the following year, the Libby party had discovered gold on Melsing and Ophir creeks, and with N. O. Hultberg, a missionary from Cheenik, P. H. Andersen, a mission teacher, and Dr. A. N. Kittlesen, assistant superintendent of the reindeer station at Port Clarence, had formed a mining district and staked out the townsite of Council City (Cole 1984).

Later in 1898 a group of men who had met at Council traveled west to the Snake River, where they staked claims that would begin the great rush to Nome. Although there is confusion about who may have first discovered gold in the Nome area, the first claims to be staked were laid out by the three "lucky Swedes" Jafet LIndeberg, John Brynteson, and Eric Lindblom.

Through the winter of 1898-99 there was modest interest in the new find at Nome, with men traveling to the area from St. Michael and the diggings on the Yukon, but with little excitement in the outside world. Brooks estimated the population of Nome to have been about 250 by May of 1899, growing to 400 by June (1908a).

The first serious mining took place in the summer of 1899 and the results were spectacular. One source estimates that nearly $800,000 worth of gold was removed from only two creeks (Trezona 1900). (At today's price for gold, the return from these two streams would be worth in excess of $15 million.)

Once word of the mining that took place in the early part of the summer of 1899 reached the outside world and confirmed the richness of the ground, interest in the area increased. Many of the miners along the Yukon joined the first rush to Nome, along with several shiploads of hopefuls from the outside world, increasing the population to nearly 3,000 (Brooks 1908a).

This same summer gold was discovered on the beaches near Nome, where it could be profitably mined by one or a few individuals with simple technology. As word of this spread, a large part of the population took up beach mining with shovel and rocker, removing an estimated $1 million in less than two months (Brooks 1908a). Tales of the easy pickings on the beaches, in conjunction with the millions taken from a few creeks, laid the ground for the major rush of 1900.

When the sea lanes opened to Nome in 1900 hopeful stampeders flooded into the area. According to one source, 15,000 people arrived at Nome within a period of two weeks (Harrison 1905). Brooks (1908a) states that more than 50 vessels had landed at Nome by the first of July, and that the first and second sailings had brought over 20,000 people to the area. Whatever the exact figures, the overall effect was that nearly overnight a large community developed where less than two years previously there had been only vacant tundra.

While many of these hopeful miners concentrated on the beaches in the hopes of quickly striking pay dirt, other prospectors spread out throughout the peninsula, and 1900 saw the first discovery of gold in the Bluestone and Kougarok valleys (Brooks 1908a, 1908b). By 1901 miners were working in the Agiapuk area (Nome Nugget 1901a) and the initial discovery of gold in the Candle area had been made (Nome Nugget 1901b). By the end of 1901 there were 200-300 people living in the Candle area (Nome Nugget 1901c). By no later than 1904 there was regular commercial travel between Nome and Council (Nome Nugget 1904) and by 1907 railroad had been constructed from Nome to Shelton in the Kugarok country, providing improved access to the interior of the peninsula (Nome Daily Gold Digger 1908).

The gold rush was not nearly as significant in the northern portion of the planning area. An abortive rush to the Kobuk River in 1898-99 resulted in several hundred miners spending the winter in the area. By the following year, however, almost all had left (Burch 1998). In 1909 placer gold was discovered on Klery Creek, a tributary of the Squirrel River (Smith 1911). While prospecting continued along the Kobuk River and its tributaries, the Squirrel River placers remain the only historically-significant mineral development in the northern part of the planning

area. A supply depot was established near the mouth of the Squirrel River at about this time, and grew into the current community of Kiana (Burch 1998).

Reindeer were first introduced to the Seward Peninsula by the Reverend Sheldon Jackson, General Agent for Education in Alaska, in 1892 (Stern et al. 1980). Between 1892 and 1914 reindeer were primarily owned by the government, missions, and individual Lapps and Eskimos. Non-Alaska Native ownership increased between 1914 and 1939, especially by the Lomen family, who shipped significant quantities of reindeer meat to markets in the continental U.S. The Reindeer Act of 1937 restricted ownership to Alaska Natives and by 1940 all herds and improvements owned by non-Alaska Natives had been purchased. Reindeer herd populations in Alaska reached a high of about 640,000 in 1932, dropping to around 250,000 in 1940 and to only 25,000 in 1950 (Stern et al. 1980).

Missionaries began to be active in the planning area beginning around 1890. Early missions were established at Golovin, Teller, Point Hope, Wales, and Kotzebue (Ray 1975, Burch 1998). When Sheldon Jackson began importing reindeer, he often selected missions as recipients of the animals, and between 1894 and 1901 herds were established at the missions at Wales, Golofnin Bay, Teller, and Kotzebue (Stern 1980). Jackson also funneled government education funds through mission schools (Mishler 1986). Missions thus became early and concentrated agents of culture change, combining access to new material culture with the opportunity for education and exposure to new spiritual ideas.

Missionaries spread out from the initial missions, establishing missions and schools in surrounding areas. Often, the mission and its school became the nucleus around which permanent communities developed. Such is the case with the current communities of Kobuk, where a mission was established in 1903 (Burch 1998) and Selawik, where a mission was established in 1908 (Burch 1998). Those missionaries who adapted to life in northwest Alaska and who stayed for an extended period made a significant impression on Alaska Natives. One example is Father Bellarmine Lafortune, who came to Nome in 1903 on a temporary assignment and stayed until his death in 1945. His spiritual leadership of the King Islanders and his role in the development of the orphanage at Pilgrim Hot Springs make him an important and enduring historical figure on the Seward Peninsula (Renner 1979).

## c) Historical Themes in the Planning Area

This brief sketch of the history of the planning area suggests several historic themes that might apply. Mishler (1986) proposed six themes for northwest Alaska in a thorough review of the area completed for state land use planning. These themes were 1) Exploration and Discovery, 2) Commercial Whaling, 3) Mining, 4) Missionization and Education, 5) Reindeer Herding, and 6) Transportation and Communication. These themes apply equally well to Federal lands in northwest Alaska, although material remains representative of all themes are not likely to be found on BLM-managed lands.

## d) Known Sites

The following discussion is based on an analysis of known cultural resources in the planning area derived from information in the Alaska Heritage Resources Survey (AHRS) database, and on land status as provided by the Fairbanks District Office's GIS layers. There are two major limitations to the accuracy of the data generated by both of these systems. First, there are a

number of sites within the AHRS whose exact location has never been verified. Many sites in the system were entered from published literature, and early reports often omitted precise site locations. Other database entries were based on information gathered from oral interviews, and these verbal descriptions of location have often not been verified. Second, due to the sheer amount of data involved, BLM's GIS tracks land status only down to the level of individual sections. If there is any non-BLM land within a given section, that entire section will display with ownership other than BLM based on a pre-determined, prioritized list of landowners. This "generalized" land status has the potential to affect the accuracy of site ownership.

When the generalized land status coverage is produced, each PLSS section in the state is queried against the Alaska Lands Information System (ALIS) to determine which major land holders have surface management responsibility for any lands in that section, then a prioritizing filter is applied. The first land owner/manager on this prioritized list that has surface management responsibility is the generalized land status for the entire section.

AHRS data and BLM GIS data can be used to generate a general idea of the current status of cultural resources in the planning area. This data is the latest available and can be treated as a very good estimate. There are approximately 2,000 known historic or prehistoric sites located within the planning area boundary. Of these, less than 300 are located on land currently managed by the BLM. Table 3-13 shows the known BLM-managed sites in the planning area, organized by land status and chronological period. Table 3-14 shows known sites organized by cultural affiliation. A few observations can be made from the information in these tables.

Over 80 percent of all known sites are situated on lands selected by the State or by Native corporations. While this figure may be somewhat inflated as a result of the way land status is determined in GIS, one of the major factors that will influence management of cultural resources in the planning area over the next decade is the on-going resolution of land status. Both the State and Native corporations have selected more lands than will eventually be conveyed to them, and as the conveyance process proceeds, it is likely that some of the sites currently on selected lands will return to BLM management. Final ownership of cultural resources in the planning area should be carefully monitored to determine if new management opportunities become available.

**Table 3-13. Known Cultural Resource Sites in the Planning Area by Land Status and Chronological Period**

| Land Status | Chronological Period | | | Total |
|---|---|---|---|---|
| | Prehistoric | Historic | Other | |
| BLM | 35 | 14 | 3 | 52 |
| Native-selected | 70 | 52 | 11 | 133 |
| State-selected | 52 | 30 | 8 | 90 |
| Total | 157 | 96 | 22 | 275 |

Table 3-14 displays some other important aspects of the cultural resource base in northwest Alaska. This table contains totals for all of the sites or components of sites for which a cultural affiliation has been identified. Because some sites contain more than one component, the numbers are somewhat different from the previous table. Note that half of the known sites on BLM-managed lands cannot be associated with a particular culture or archaeological assemblage. This is primarily the result of a large number of sites that lack diagnostic artifacts. Surface lithic scatters, tent rings, cairns, hunting blinds, and rock caches are examples of the

kinds of sites that often lack any association with materials that can be assigned to a known archaeological assemblage or that can be used to date the site.

**Table 3-14. Sites or Site Components by Cultural Affiliation**

| Culture | Occurrences |
|---|---|
| Known | |
| Denbigh | 2 |
| Choris | 6 |
| Norton | 5 |
| Ipiutak | 2 |
| Eskimo* | 93 |
| Euroamerican | 37 |
| Total Known | 145 |
| Total Unknown | 145 |
| Total | 290 |

*In this table, the term “Eskimo” includes Birnirk, Thule, and recent Eskimo sites.

Of the 145 sites that can be placed in the chronology for the region, almost 90 percent are attributed to late prehistoric or historic Eskimo or Euroamerican cultures. This means that the earliest steps in the regional chronology are represented by only a handful of sites. In fact, because some of the information in the previous table is derived from sites with more than one component, the 15 occurrences from Denbigh, Choris, Norton, and Ipiutak actually come from only seven known sites. In other words, while there is an accepted chronology for northwest Alaska that spans 11,000 years, we currently know of no sites representing the first 7,000 years on BLM-managed lands, and we know of only seven sites that represent the next 3,000 years. Almost all known sites on BLM-managed lands in the planning area fall within the last 1,000 years of the regional chronology.

# *10. Paleontological Resources*

Little work has been done to inventory paleontological materials on BLM-managed lands in northwest Alaska. The BLM has conducted no program of baseline inventory, nor any compilation of existing information, for almost 20 years. In 1986, the BLM contracted for a compilation of data on paleontological resources on BLM-managed lands (Lindsey 1986). This discussion is based on information from these two compilations.

There are 171 occurrences of paleontological resources on BLM-managed lands in the planning area. Of these, all but 20 are located in the northern part of the area. There are 93 recorded occurrences in the DeLong Mountains-Point Hope area, 58 in the area drained by the Kobuk and Selawik rivers, and only 20 in the Seward-Peninsula-Norton Sound area.

The distribution and nature of fossil occurrences in the planning area are undoubtedly a function of the severely limited amount of inventory that has been conducted and should not be taken as representative of the area. For example, Pleistocene fossils are known to occur in numerous coastal and riparian contexts on non-BLM-managed lands in the planning area, yet such materials are almost completely absent from the small collection originating on BLM-managed lands.

# *11. Visual Resources*

The BLM's Visual Resource Management (VRM) program attempts to balance the uses of public lands with the protection of areas containing high scenic values. Scenic quality is an essential component of most recreation activities. The public enjoys a wide variety of outdoor activities that depend on high quality visual resources.

The BLM is responsible for managing the negative impacts that surface-disturbing activities can have on the visual resources of public lands. VRM ensures that scenic values are maintained, while allowing for multiple uses to occur on public lands.

## a) Visual Resource Inventory Classes

The visual resource inventory process provides the BLM with a means of determining visual values. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones. Based on these factors, BLM-managed lands are placed into one of four visual resource inventory classes which represent the relative value of the visual resources.

Class I is assigned to those areas where a management decision has been made to maintain a natural landscape. These would include areas such as congressionally-designated wilderness areas, wilderness study areas, the wild sections of National Wild and Scenic Rivers, and other congressionally- and administratively-designated areas where the decision has been made to preserve a natural landscape. Classes II, III, and IV are assigned to areas of the planning area based on a combination of scenic quality, sensitivity level, and distance zones. Generally the lower the class number, the more sensitive the area is to visual intrusions.

**Class I Objective:** Preservation of the landscape is the primary management goal in Class I areas. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

**Class II Objective:** The objective of this class is to retain the existing character of the landscape. Activities or modifications of the environment should not be evident or attract the attention of the casual observer. Changes should repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. The level of change to the characteristic landscape should be low.

**Class III Objective:** The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes caused by management activities may be evident but not detract from the existing landscape.

**Class IV Objective:** The Class IV objective is to provide for management activities that require major modification of the existing character of the landscape. Changes may attract attention and be dominant landscape features but should reflect the basic elements of the existing

landscape. A Class IV rating is generally reserved for areas where visual intrusions dominate the viewshed but are in character with the landscape (areas such as rural communities, multiple subdivisions, mining, and oil and gas developments). The level of change to the characteristic landscape can be high.

## b) Visual Resource Management Classes

The inventory classes discussed above do not establish management direction. Inventory classes are informational in nature and provide the basis for considering visual values during land management planning. During the planning process, the class boundaries are adjusted as necessary to reflect the resource allocation decisions made in the RMP, resulting in proposed visual management classes as shown in the alternatives in Chapter II (Map 2-1, Map 2-2, and Map 2-3). The maps vary by alternative and the information is not currently applied since as noted below, no management classes currently exist.

Under existing management, no VRM classes are assigned to the planning area. Although VRM is not addressed in the current MFP, permitted activities in the planning area are generally required to minimize impacts to visual resources. Using the VRM Contrast Rating Sheets, mitigation measures include such things as revegetation or recontouring of disturbed areas, using natural barriers as screening, and using materials and colors that blend into the environment.

## c) Condition and Trend

During the summer of 2004 the BLM conducted a VRM field inventory that consisted of four overflights and driving the Nome road system (Dilts and Westcott 2004). VRM inventory classes were developed for all lands within the planning area through the spatial analysis of overflight information using GIS software, on-the-ground observations and photographs, scenic quality ratings, distance classes, viewshed analysis, sensitivity classes, and specialist input. Visual Resource Inventory classes are shown on Map 3-21 and displayed in Table 3-15.

Areas of high visual sensitivity include the road system out of Nome, areas with high levels of recreational use, Native allotments, and villages. Travel routes used in the inventory included the Nome-Teller Highway, Nome-Taylor Highway, Nome-Council Road, and selected rivers. Other major travel corridors include navigable rivers and inter-village winter trails. Winter trails are used in the winter when most of the landscape features are covered with snow. There is little public land in the vicinity of most villages in the planning area. Areas of high recreational use are primarily limited to the Squirrel River and lands near the Nome road system. Much of the access into public lands is via small fixed-wing aircraft. Visual scars only visible for short distances from the roads, trails, or rivers may be highly visible from the air.

There are no VRM Class I areas in the planning area. Class II and III areas are found in the mountainous areas such as the Squirrel River, Brooks Range, Nulato Hills, Bendeleben Mountains, and Kigluaik Mountains. The remainder of the planning area is Class IV.

**Table 3-15. VRM Inventory for the Kobuk-Seward Peninsula Planning Area**

| VRM Class | Acres | Percent of Planning Area |
|---|---|---|
| I | 0 | 0 |
| II | 3,760,000 | 28 |
| III | 790,000 | 6 |
| IV | 8,690,000 | 66 |

Note: Acres rounded to the nearest ten thousand.

INSERT 11x17 MAP
**3_21_vrm_inv**

# 12. Wilderness Characteristics

There are no Congressionally-designated wilderness areas in the planning area; however, almost all BLM-managed lands within the planning area, especially those removed a short distance from villages, possess wilderness characteristics of solitude, opportunities for primitive and unconfined recreation, and for the most part are natural.

Residents travel extensively by motorized vehicle (primarily snowmachines and four-wheelers) over parts of the planning area and occupy seasonal dwellings or fish camps outside of villages. These motorized uses are generally for subsistence purposes and are authorized per Section 811 of ANILCA. Other than the Nome road system and the Red Dog Mine Road, there are virtually no roads outside of the villages. Some mining is ongoing, mostly on State land. Mining is the major land impact other than ongoing subsistence activities and dispersed recreational use. The overall impression of the planning area is that it is a natural area, untrammeled by humans, with very few obvious signs of modern humanity's influence or presence. Visitors and residents can easily find opportunities for solitude.

## a) Characteristics by Unit

For the purposes of discussion of wilderness characteristics, the planning area was divided into the following nine units: De Long, Noatak, Squirrel River, Upper Kobuk, Nulato Hills, Deering, Shishmaref, Wales, and Southern Seward Peninsula. A general summary of wilderness characteristics in each unit follows (Map 3-22).

### (1) De Long Unit

This area is located in the northern portion of the planning area, west of the National Petroleum Reserve-Alaska (NPR-A). It includes portions of the De Long Mountains, the Brooks Range foothills, and the North Slope. There are three coastal villages adjacent to this unit: Point Hope, Point Lay, and Kivalina. The unit includes approximately 3.1 million acres of BLM-managed land, 75 percent of which is currently selected by the State and Native corporations. The area is roadless, natural outside of village influence, and provides opportunities for solitude and unconfined recreation.

### (2) Noatak Unit

This area is located north of Kotzebue. It is bounded on the east by the Noatak National Preserve and on the west by the Cape Krusenstern National Monument. It includes approximately 287,000 acres, 99 percent of which is currently selected. The village of Noatak is adjacent to the unit. This area includes the lower portion of the Noatak River and uplands. The area is roadless, natural outside of village influence and provides opportunities for solitude and unconfined recreation.

### (3) Squirrel River

This area is located northeast of Kotzebue. It is bounded on the west and north by the Noatak National Preserve, on the east by Kobuk Valley National Park, and on the south by Selawik National Wildlife Refuge. The village of Kiana is located on the southern edge of the unit. This

area includes approximately 1.1 million acres of BLM-managed land. Of this acreage, 58 percent is currently selected. This area includes the Squirrel River valley and portions of the Baird Mountains. The area is roadless, natural outside of village influence, and provides opportunities for solitude and unconfined recreation.

### *(4) Upper Kobuk*

This unit is located in the far eastern part of the planning area. The unit is surrounded by the Selawik NWR, Kobuk Valley National Park, State land, and Gates of the Arctic National Park and Preserve. There are three villages within the unit: Ambler, Shungnak, and Kobuk. The unit is approximately 1.3 million acres in size, and approximately 57 percent of the land is currently selected. The area is roadless, natural outside of village influence, and provides opportunities for solitude and unconfined recreation.

### *(5) Nulato Hills*

This area is on the southeastern edge of the panning area. The Selawik NWR bounds the northeastern edge of the unit and there is a large block of State land located to the west. There are two villages within this unit: Buckland and Shaktoolik. Kotzebue is located to the northwest. The area includes approximately 3.4 million acres, 41 percent of which is selected. The area is roadless, natural outside of village influence, and provides opportunities for solitude and unconfined recreation.

### *(6) Deering Unit*

The Deering Unit is located on the northeastern Seward Peninsula. The unit is surrounded by the Bering Land Bridge National Preserve, State lands, and the Chukchi Sea. The village of Deering is located within this unit. The unit is approximately 128,000 acres, 99.8 percent of which is currently selected. It is split into three smaller subunits by private land. The area is roadless, natural outside of village influence, and provides opportunities for solitude and unconfined recreation.

### *(7) Shishmaref Unit*

This unit is located on the northern edge of the Seward Peninsula and is surrounded by the Bering Land Bridge National Preserve and the Chukchi Sea. It encompasses approximately 76,000 acres, 99 percent of which is selected. It is primarily flat, coastal tundra. The village of Shishmaref is located north of the unit. The area is roadless, natural outside of village influence, and provides opportunities for solitude and unconfined recreation.

### *(8) Wales Unit*

This unit is located on the northwestern edge of the Seward Peninsula and is surrounded by the Bering Land Bridge National Preserve, State land, and Native corporation land. It encompasses approximately 171,000 acres, 60 percent of which is selected. The village of Wales is located on the edge of the unit. The area is roadless, natural outside of village influence, and provides opportunities for solitude and unconfined recreation.

### *(9) Southern Seward Peninsula Unit*

This unit encompasses the entire southern half of the Seward Peninsula and includes about 3.6 million acres, 71 percent of which is selected. Nome and several coastal villages are located near the unit. The road system out of Nome crosses the unit with about 200 miles of road. There is very little BLM-managed land adjacent to the roads. The BLM land within the unit is scattered in large blocks among State and Native corporation land. The northern edge is bounded by Bering Land Bridge National Preserve and State land. The Elim Reservation bounds the southeastern edge of the unit. The unit includes various landforms including the Kigluaik, Darby, and Bendeleben mountains, coastal lowlands, marshes, and several large rivers. Outside of the road system in the Nome area, the area is roadless, natural outside of village influence, and provides opportunities for solitude and unconfined recreation.

In general, risk of losing the wilderness character of the planning area is minimal, given the remoteness of the area, rough terrain, and lack of projected development.

## b) Legislative History Relevant to BLM Wilderness

The Wilderness Act of 1964 established a national Wilderness Preservation System in the United States. The Federal Land Policy and Management Act (FLPMA) of 1976 established principles and procedures for management of public lands, as well as a process to inventory and study lands potentially suitable for wilderness designation. In accord with FLPMA, the BLM initiated plans (Management Framework Plans) for lands in Alaska in the early 1980s. However, a wilderness inventory was not completed due to a congressional freeze on funds slated for wilderness reviews in Alaska. In 1981, Interior Secretary James Watt issued a departmental memo prohibiting the BLM from initiating wilderness studies. Twenty years later, Interior Secretary Bruce Babbitt rescinded this direction and enabled the BLM to review potential wilderness areas in Alaska. In 2002, the BLM was instructed to address wilderness as a component in any future land use plan.

On April 11, 2003, Interior Secretary Gale Norton issued a letter regarding wilderness proposals in Alaska. It stated that during the land use planning process, the BLM should consider specific wilderness study proposals that receive broad support among Alaska's elected officials. Without this support, wilderness proposals should not be considered in the planning process.

Referencing Secretary Norton's letter, the State of Alaska through the ADNR sent a letter to the BLM expressing their desire that the BLM not consider wilderness study proposals in the Kobuk-Seward Peninsula RMP (ADNR 2004). To this end and per the Secretary's instructions, some areas may be considered for management under other designations such as Area of Critical Environmental Concern (ACEC) or Research Natural Area (RNA).

As a result of Secretary Norton's direction on the wilderness process in land use plans in Alaska and the resulting State of Alaska letter stating their opposition to any further wilderness proposals being addressed in the plan, the BLM will not conduct any further impact analysis on wilderness in this EIS.

INSERT 8½ x11 MAP
**3_22_wilderness**

# C. Resource Uses

## *1. Forest Products*

Siberia, Scandinavia, northern Canada, and Interior Alaska are the primary locations for the green mantle of subarctic forest wrapping the earth. Forested lands within the planning area are part of this band of northern forest, known collectively as the boreal forest or taiga. Only the hardiest of tree species can withstand the combination of short growing season, cold and shallow soils, plus frigid and dry, often abrasive winter winds. Boreal forest in the planning area is characterized by closed, open, and woodland evergreen forests of white and black spruce. Mixed forest types are also common, composed of varying amounts of deciduous trees (birch, balsam poplar, and aspen) scattered in with spruce.

Forest communities in the planning area are primarily open-canopied woodlands dominated by white spruce (*Picea glauca*). White spruce will tolerate a wide range of site conditions, but grows best on well drained soils of gentle, south-facing slopes or deeper soils of protected river valleys. Stands of black spruce (*Picea mariana*) occupy low, poorly drained areas with fine-grained soils, or occasionally dominate stands of regrowth after fire. Paper birch (*Betula papyrifera*) is scattered in small groves in some areas at protected sites with porous, deeper soils. Balsam poplar (*Populus balsamifera*) stands form narrow, linear units along stable river banks. Small, stunted quaking aspen (*Populus tremuloides*) are occasionally found in the most interior portions of the planning area on dry, warmer soils of south-facing slopes or low hilltops.

Within the planning area, forest lands cover only 8 percent of BLM-managed lands, just under one million acres (USGS 1997). There are five main regions within the planning area characterized by forested landscapes: the southeast corner of the Seward Peninsula, the Nulato Hills, the Kobuk River valley, the Squirrel River valley, and the lower Noatak River corridor (Map 3-24).

BLM has not conducted an inventory of forest resources for the planning area. A study done by the U.S. Bureau of Indian Affairs in the early 1970s at the Norton Bay Native Reserve (now known as Elim Native Corporation lands) indicated net annual growth on more productive forested sites ranged from 4-9.9 cubic feet per year (Zufelt 1973). A 1960s statewide inventory by the USDA Forest Service (Hutchison 1967, Selkregg 1976) concluded that for wooded areas of northwest Alaska 13 percent of tree growth can be classified as commercial, specifically an annual growth of at least 15 cubic feet per acre. For the planning area this works out to approximately 126,200 acres of potentially commercial timber. At a suggested rotation period of 120 years (Hutchison 1967) the low volume, low productivity, scattered timber stands, and long distances involved in log transport in the planning area make commercial logging ventures impractical, while the potential to incur adverse environmental impacts is large.

Natural impacts to forest communities in the planning area include wildfire, insect pests, wind thrown trees (with shallow permafrost soils a contributing factor), and trees snapped off at 5-10 feet above the base due to high winds. Forest health issues are beginning to emerge in the south and southeastern portions of the Seward Peninsula. A spruce beetle infestation (*Dendroctonus rufipennis*) was documented by the BLM in August 2003 when areas of conspicuous beetle-killed spruce were observed and aerially photographed in the upper Tubutulik River region on the east side of the Darby Mountains (Sparks 2003). In 2004, the annual statewide aerial survey conducted by the USDA Forest Service and the ADNR, Division

of Forestry, reported 81,389 acres of beetle-killed spruce on Elim Native Corporation lands along the coast and inland from Moses Point to Mount Kwiniuk (Map 3-23). This outbreak appeared to have peaked within the last few years, with current activity being very light. USDA Forest Service and ADNR Division of Forestry personnel estimated a near total loss of the forest resource in that area (Wittwer 2005). The 2004 statewide aerial survey also documented an area of light to moderate spruce beetle activity north of the village of White Mountain along the Fish River. Mapping showed 8,681 acres of beetle-affected spruce, with the majority characterized as light intensity (Wittwer 2005). Smoke from tundra wildfires in McCarthy's Marsh prevented additional survey in this region during the summer of 2004.

Earlier aerial surveys flown over the Seward Peninsula and other portions of the planning area in 1991, 1999, 2000, and 2002 by the USDA Forest Service and ADNR Division of Forestry mapped small patches of light spruce beetle activity in the Tubutulik River drainage (1991), South Fork of the Buckland River (1999), and lower Fish River (2002), plus low to moderate spruce beetle damage of limited acreage (52 acres) along the upper Kobuk River in 2000 (Map 3-23) (U.S.D.A. Forest Service 1991, Wittwer 1999, Wittwer 2001, and Wittwer 2003). One system used by State and Federal foresters and entomologists to rate spruce beetle activity describes a light spruce beetle infestation as 1-5 dead trees per acre, moderate as 6-10 dead trees per acre, and severe as more than 10 dead trees per acre (Wittwer 2005, Zogas 2005).

On July 28, 2005, BLM personnel from the Fairbanks District Office and NRCS personnel from the Homer Office conducted an informal aerial and ground survey of BLM-managed lands along the Tubutulik River in the southeastern corner of the Seward Peninsula to estimate the extent of beetle-killed white spruce forest (Meyers et al. 2005). Approximately 45,850 acres were surveyed by helicopter, with two landings made to examine individual trees more closely. A "TracBack" feature on a Garmin III Plus GPS unit was used to create a record of the area covered. The area surveyed followed the Tubutulik River from the mouth to the headwaters, plus adjacent uplands to the east between the Tubutulik River and June Creek. Gray, standing dead trees were an obvious component of the valley bottoms and hillsides. In some places gray and red trees were observed (red indicating more recent death of the tree). Based on both ground and aerial observations the affected trees ranged in size (diameter and height), indicating the beetles were attacking trees of all sizes (from 4.5-12 inches diameter at breast height), not just the largest trees. During informal aerial observations, dead trees ranged from patches of approximately one acre in size with all standing dead, to one dead tree in every five trees, one in every 10 trees, one in every 20-30 trees, or one dead in every 30-40 trees. Lower slopes and flats seemed to have a lower incidence of dead trees, and the higher slopes and heads of valleys a greater percent.This may have been tied at least partly to moisture: drier soils on upper slopes may have increased drought stress, making the trees more susceptible to beetle attack. Examination of trees on the ground in two locations showed that the beetle infestation was ongoing, as trees with dead, reddish-brown needles of current growth (but otherwise green-needled), with beetle bore holes and evidence of increased pitch production stood next to dead, gray-limbed trees with bark flaking off in large patches. Based on the informal survey of the Tubutulik River and adjacent uplands it was estimated this area has sustained a moderate to severe level of spruce beetle activity (Meyers et al. 2005).

With standing dead and fallen timber of beetle kill origin letting in more light, early seral species such as grass (*Calamagrostis canadensis*, and others) may colonize, providing a source of flash fuels that could support larger and more intense fires than normally expected for the southeastern Seward Peninsula.

**Demand for Forest Products**

The BLM forest resource program in northwest Alaska is basically in custodial management. Little demand exists for forest products from BLM administered lands. Most lands with forest resources are located in remote areas with poor or non-existent access. Many of the timber stands are several hundred miles from the nearest road.

The Kobuk-Seward Peninsula planning area is a sparsely timbered region of Alaska, and contains vastly more tussock tundra, shrublands, and thinly vegetated alpine land cover than it does woodland and forests. Many riparian corridors with accessible timber have been conveyed to village or regional Native corporations, and in some cases the State, leaving little easily accessible timber under BLM jurisdiction. The forestry program managed by BLM in northwest Alaska has focused mainly on processing a low volume of permits for personal use house log and firewood, and a single Christmas tree sale. Forestry management issues may be more related to habitat management rather than demand for forest products.

Since 1980 the BLM has issued nine free use authorization permits for house logs and firewood and one small sales vegetative contract for Christmas tree harvest in the planning area. Two free use permits granted in 1994 for a total of 220 house logs and the small sales contract for 10 Christmas trees in 2004 have been the most recent actions. From 1978-1980 two timber sales were conducted in the planning area, totaling 7,405 linear feet. Also during 1978-80 two free use permits were issued for 80 house logs and 1,000 board feet of sawtimber, plus four free use permits for a total of 500 cords of wood and 460 house logs. However, the lands harvested for timber during 1978-1980 are no longer under BLM management.

Current authorized use of forest products in the planning area during the last 14 years has been less than 10 free use permits, plus one small sales vegetative contract. The amount of unauthorized use is difficult to monitor or estimate, given the size and remoteness of the area and current level of staffing. It is estimated that the amount of authorized and unauthorized use is well below that which the resource can sustain. Incremental increases of individual use products like firewood and house logs can be expected as rural population numbers in the planning area increase over time.

The remote nature of forested lands coupled with changing land ownership patterns has resulted in a situation where little is known about the resource. The first step in management is inventory. In order to adequately determine the condition and quantity of the forest resource, a basic inventory should be conducted. The inventory should provide location of timber stands, their age, size class, and species composition, plus current and predicted health (including insect infestation level and disease potential). Pockets of old growth white spruce, which may have escaped fire for 200-300 years or more, should be noted. These old growth stands often have abundant and unique arboreal lichens (examples of significant range extensions) and are of scientific interest and research potential (Juday 1985, Meyers 1995d, 1997c). Their presence increases the diversity of forested plant communities in the planning area. Without a comprehensive, baseline timber survey professional management of the resource will be limited.

No prescribed burns or fuels treatments have been conducted in the planning area in the past. The forest inventory recommended for the planning area would provide baseline information needed to assess future management direction for forest resources, including a possible need for more intensive management to enhance wildlife habitat or reduce hazardous fuels. Guidance and authorities provided by the Healthy Forests Restoration Act of 2003 would be utilized to structure hazardous fuels reduction and forest health improvement treatments identified as necessary.

INSERT 8½x11 MAP
**3_23_forestry_sbb**

INSERT 11x17 MAP
**3_24_forestry_veg**

## 2. Livestock Grazing

Sheldon Jackson initially introduced reindeer (*Rangifer tarandus tarandus*) into Alaska from Siberia in 1891. Reindeer herding was heralded as a way to develop an economic base and a reliable food source for the rural residents of the Seward Peninsula, as caribou populations had declined due to market hunting and natural fluctuations. Scandinavians were brought in later in that decade to teach and work in the herding industry. The first shipment of reindeer meat to the Lower 48 was in 1911. Over 33,000 reindeer were counted during that year. Reindeer research was conducted from 1920 to 1935 by the U.S. Biological Survey and the FWS. The number of reindeer in Alaska peaked in 1932, with an estimate of over 640,000 head. Of these, 127,000 resided on the Seward Peninsula. The Reindeer Act of 1937 restricted ownership of reindeer herds to Alaska Natives. In 1940 the government bought 84,000 head from non-Alaska Native owners. By 1950, the number of reindeer in Alaska was estimated to be 25,000 individuals. Overgrazing, predation, and less active herding were all thought to have contributed to the decline. Brucellosis was introduced to caribou and other ungulates in Alaska via the original reindeer introductions.

The term “range” is used to indicate Federal lands available for the grazing of reindeer and livestock. The entire Seward and adjacent Baldwin peninsulas are broken up into different grazing allotments; there are no other grazing allotments in the planning area. However, there is nothing in the current MFP that disallows grazing in other parts of the planning area. There are currently 15 reindeer grazing allotments covering 12.6 million acres. There are two vacant areas (the northern portion of the Menadelook allotment in the upper Kuzitrin River watershed and McCarthy’s Marsh) covering 1 million acres, and two areas not designated for grazing (Nome and Elim) covering 0.3 million acres. Specific acreages of each allotment is shown in Table 3-16. Map 3-25 portrays the locations of the allotments within the planning area.

Extensive incursions onto the Seward Peninsula by the enormous WACH have been devastating for reindeer herders. The WACH consists of approximately 490,000 caribou (*Rangifer tarandus granti*). Reindeer on all of the eastern allotments have mixed with the WACH and subsequently emigrated with the herd on its annual spring migration. There are currently no active herders on the eastern side of the Seward Peninsula. All but the westernmost herders have been strongly affected by the WACH’s extensive incursions on to the peninsula. Reindeer have run off with members of the WACH for decades at least, but this emigration was constrained mainly to the northern and easternmost herds. There were a total of about 7,500 reindeer corralled by the only five active herders in 2004. The UAF Reindeer Research Program and the Kawerak Reindeer Herders Association estimate that only 80 percent of a herd is typically rounded up for a particular corralling. Therefore, there may have been as many as 9,000 reindeer on the Seward Peninsula in 2004.

**Table 3-16. Grazing Allotments in the Kobuk-Seward Peninsula Planning Area**

| Allotment Name | Acres* |
|---|---|
| Sheldon | 1,695,000 |
| Karmun | 1,229,000 |
| Goodhope | 1,130,000 |
| Hadley | 1,110,000 |
| Grey | 1,047,000 |
| Weyiouanna | 1,000,000 |
| Davis | 956,000 |
| Kakaruk | 838,000 |
| Noyakuk | 762,000 |
| Henry | 707,000 |
| Ongtowasruk | 599,000 |
| Olanna | 524,000 |
| Sagoonik | 400,000 |
| Walker | 360,000 |
| Menadelook | 301,000 |

* Includes State and National Park Service lands.

Since the allotments contain intermingled Federal, State, and private lands, grazing is managed jointly by the BLM, NPS, and ADNR under a Memorandum of Understanding (MOU). The herder also obtains permits for the use of private lands through the Native corporations.

Besides reindeer emigrating off the Seward Peninsula, reindeer herding also faces the problem of hunters and predators killing reindeer. ADF&G and the UAF Reindeer Research Program have tried to mitigate the problem associated with emigration and hunters by using satellite collars on reindeer and caribou to allow the herders to try to move their herds away from the movements of the WACH. This information could by used by the Reindeer Herders Association to anticipate expansion of reindeer herds if and when the WACH's population decreases and range shrinks correspondingly.

Inquiries have been received about the possibility of grazing other species, such as bison (*Bison bison*), on the Seward Peninsula. Grazing by other forms of livestock is not currently occurring within the planning area, nor was it addressed in the MFP.

Another potential use of the range resource is grazing of pack animals associated with special recreational permits (SRPs). To date, the BLM has not authorized this type of use and there are currently no commercial operators using pack animals in the planning area.

INSERT 8½x11 MAP
**3_25_grazing**

# 3. Minerals

## a) Leasable Minerals

### (1) Oil and Gas

The Kobuk Seward planning area contains parts of three basins: the Colville, Kotzebue/Hope, and Selawik basins. At present there are no active Federal oil and gas leases within the planning area. A total of five hydrocarbon wells have been drilled within the boundaries of the planning area. Areas currently open to mineral leasing are shown on Map 3-26.

#### (a) History and Development

**1. Colville Basin**

The Colville Basin is one of two basins in Alaska (the other being the Cook Inlet Basin) where hydrocarbons are being produced. While oil out of Prudhoe Bay has been produced for many years, exploration has made it only halfway through the Colville Basin and is primarily focused in the north along the Barrow Arch.

Several wells have been drilled within the portion of the Colville Basin that encompasses the planning area. Eagle Creek #1 was drilled by Chevron in February 1978 and completed in December 1978. It reached a total depth of 12,049 feet in the Lower Cretaceous. The purpose of the test hole was to test structures in allochthonous rocks of the Brooks Range foothills (Moore and Potter 2003). Gas was recovered in drill stem tests from sandstones within the Nanushuk or Torok formations. The well was plugged and abandoned.

Tungak Creek #1 was drilled by Unocal in December 1981 and completed in March 1982. The well reached the Torok Formation at its total depth of 8,212 feet. The well encountered pooled gas at depth. Gas quantities are similar to those encountered at Wolf Creek, Gubik, Meade, and Square Lake within NPR-A.

Akulik #1 was drilled by Chevron Inc. in April 1981. The well was drilled to a total depth of 17,038 feet. Gas was recovered in drill stem tests from sandstones within the Nanushuk or Torok formations. The well was plugged and abandoned.

**2. Kotzebue/Hope Basin**

Two hydrocarbon test wells, Cape Espenberg and Nimiuk Point, were drilled in the Kotzebue/Hope Basin. Both were drilled in the mid-1970s by the Standard Oil Company of California (SOCAL). Cape Espenberg #1 was drilled in 1975 to a total depth of 8,373 feet. The drill hole did not encounter anything that would classify as an oil or gas show, but small indications of methane associated with coalbeds were present in the mudlog. Four formation tests were conducted but recovered only salt and no hydrocarbons (Troutman and Stanley 2002).

Nimiuk Point #1 was drilled five miles west of the Selawik NWR boundary. The well was bored in the same locality as the conceptual Early Sequence Play. It reached a total depth of 6,311

feet. The well proved largely unsuccessful. A formation test was run between 3,537 and 3,755 feet in which a short blow was observed, but no gas was observed at the surface, making the test inconclusive. Gas zones identified by geophysical well logs were present from 1,130-1,132 feet, and from 1,158-1,160 feet, but were determined to be too thin to hold economic quantities of gas, if they in fact do contain gas. The well was abandoned as a dry hole (Troutman and Stanley 2002).

A hole was drilled at Kotzebue in 1950 to test for fresh water. The hole ran into some high pressure gas at 238 feet, which lifted the heavy string of tools several feet into the air, showering the area with mud. The gas continued to flow for more than 24 hours. The gas may have been biogenic, formed from decaying organic matter (Troutman and Stanley 2002).

In 1973 SOCAL discovered gas at a depth of 90 feet in a seismic shot hole on the Kobuk River Delta, 33 miles southeast of Kotzebue. Samples were taken and results indicated the gas to be 66 percent methane, 26 percent nitrogen, 6 percent oxygen, 2 percent carbon dioxide, and trace amounts of ethane and higher alkanes. A similar gas show was discovered five miles east in the delta at a depth of 65 feet and with similar lab results (Troutman and Stanley 2002).

Oil seeps have been reported within the basin and in the Seward Peninsula area over the years, but these findings were either not investigated by USGS, or, if investigated, have not been confirmed. Additionally, four wells were drilled on the Seward Peninsula near Nome on two separate occasions in 1906 and 1918. The wells were located along Hastings Creek and were very shallow (the deepest reached a total depth of 210 feet). The two wells drilled in 1906 had shows. One well that reached a total depth of 122 feet had a gas show and the other well had an oil show. The gas is believed to be derived from alluvial deposits. The oil show is difficult to explain as the wells were drilled in basement rocks composed of schist and granite. The wells were drilled in response to oil-like films observed on the nearby lagoons and the films brought onshore attached to beach foams (Miller et al. 1959).

#### 3. Selawik Basin

Oil and gas activity within the Selawik Basin has been minimal. The area has been geologically mapped by the USGS during the late 1950s and early 1960s, with some additional recent mapping within select areas. There have been no oil or gas wells drilled in the basin.

### (b) Occurrence Potential

Several geologic elements are necessary for oil and gas to accumulate in sufficient quantities. These elements include an organic-rich source rock to generate oil or gas, the combined effects of heat and time, a porous and permeable reservoir rock in which to store the petroleum, and some sort of trap to prevent the oil and gas from reaching the surface. Traps generally exist in predictable places such as at the tops of anticlines, next to faults, in the updip pinchouts of sandstone beds, or beneath unconformities. Map 3-27 shows the occurrence potential for oil and gas throughout the planning area; however, there is no implication that these resources can be developed economically.

The USGS conducts estimates of oil and gas resources in the United States based on the concept of a “play,” which is defined as a set of oil and/or gas accumulations sharing similar geographic boundaries and geologic attributes, such as source rock, reservoir type, and trap (Beeman et al. 1996). Of the three basins that partially fall within the planning area, only one, the Colville Basin, has been identified as containing plays. By definition, plays defined by the USGS are to be considered high potential for future oil and gas exploration.

## (c) Development Potential

Actual development activity within the planning area will be determined by accessibility to resources, including the perceived impact of lease stipulations by the petroleum industry; exploration and development costs; the success rate of wells drilled in the future; commodity prices; and production rates required to provide an economically viable return on investment.

### 1. Topset Play

The Topset Play's primary reservoir rocks consist of sandstone and conglomerate from the Mid- to Upper-Brookian Sequence (Upper Cretaceous to Cenozoic). Porosity in the western play area ranges between 10 and 20 percent. Source rocks occur below the play interval (9,000 feet) within the Hue Shale, the Kingak Shale, and the Shublik Formation. According to Magoon et al. (1996), between 8 and 60 oil accumulations of one million barrels or more could be present in the play. Additionally, 2-90 gas accumulations with a calculated mean of 127.6 billion cubic feet could occur in the play. The overall area of the play covers roughly 26,400 square miles (Magoon et al. 1996). A total of 138,748 acres of the play are contained within the planning area.

### 2. Turbidite Play

The Turbidite Play is comprised of rocks from the Lower- to Mid-Brookian Sequence (Cretaceous age). Reservoir rocks are primarily toe-of-slope or basin-plain turbidites from the Torok and Canning formations. Sandstone bodies are thin and laterally discontinuous with reservoir thicknesses that could potentially reach 100 feet or more. Porosity ranges from 5-30 percent, with the higher value associated with eastern play rocks. Source rocks include the gas-prone Torok and Canning formations and oil-prone Hue Shale, Pebble Unit Shale, Kingak Shale, and the Shublik Formation. According to Magoon et al. (1996) resource potential of undiscovered oil accumulations (one million barrels or more) is estimated to occur between 10 and 110 locations. Between 5 and 80 undiscovered gas accumulations are estimated to occur with a calculated mean of 108.9 billion cubic feet. Total play area covers roughly 30,500 square miles (Magoon et al. 1996). A total of 298,169 acres of the play are contained within the planning area.

### 3. Ellesmerian-Beaufortian Clastics Play

The Ellesmerian-Beaufortian Clastics Play consists of stratigraphic and structural traps of Permian to Early Cretaceous age. Reservoir rocks include sandstones of the Echooka, Ivishak, and Kuparuk formations, Sag River Sandstone, Kemik Sandstone, and unnamed sandstone units in the Kingak Shale, all of which were deposited in shallow marine environments. Within the planning area, porosity is estimated to be less than 10 percent. Source rocks include the Kavik Shale, Shublik Formation, Kingak Shale, the pebble shale unit, and the Hue Shale. The shales are primarily overmature within the planning area. Oil potential is unknown and unestimated. Magoon et al. (1996) estimates between 10 and 140 gas fields with a calculated mean of 108.9 billion cubic feet (1996). Total play area covers approximately 35,000 square miles (Magoon et al. 1996). A total of 234,050 acres of the play are contained within the planning area.

### 4. Fold-Belt Play

The Fold-Belt Play primarily contains anticlinal traps in sandstone reservoirs within the Brooks Range fold and thrust belt. Potential reservoirs are sandstones representing deltaic, shallow-

marine, and turbidite environments. Porosity ranges from 5 to 30 percent, with the lower porosity rate more representative of the western portion of the play. Source rocks include several gas prone shales of the Nanushuk Group, as well as the Canning, Sagavanirktok, and Torok formations. They also include the oil-prone shales of the Hue Shale, Pebble Unit Shale, Kingak Shale, and Shublik Formation. The oil-prone rocks range from mature to overmature. Additionally, oil is less perspective in this play due to the Hue Shale thins to the west. Magoon et al. (1996) estimate between 1 and 20 of one million barrels or more. Undiscovered gas occurrences could result in 10-150 accumulations with a calculated mean of 212.7 billion cubic feet. The overall area of the play covers roughly 36,500 square miles (Magoon et al. 1996). A total of 3,374,677 acres of the play are contained within the planning area.

#### 5. Lisburne Play

The Lisburne Play is a hypothetical play that consists of structural and stratigraphic trapped carbonate or clastic reservoirs in the Lisburne Group. Potential reservoir rocks in the planning area would probably be limestone or sandstone. Limestone porosity is estimated at less than 5 percent. The sandstone is a marginal reservoir in that it may be cemented partially or completely with calcite. Source rocks beneath the planning area could include a marine shale in the overlying Sadlerochit Group, marine shale and limestone in the Lisburne Group, and marine to lacustrine shale and coal in the underlying Endicott Group. Undiscovered oil potential was not determined; however, between 1 and 100 gas accumulations could be present with a calculated average of 287.6 billion cubic feet. The overall area of the play covers approximately 57,000 square miles (Magoon et al. 1996). A total of 4,180,072 acres of the play are contained within the planning area.

#### 6. Lisburne Unconformity Play

The Lisburne Unconformity Play is a hypothetical play that consists of stratigraphic traps that developed as a result of differential erosion on the Permian or Lower Cretaceous unconformities that lie at the top of the Lisburne Group. Reservoir rocks are primarily limestone. Source rocks are gas-prone marine and non-marine shale. Oil and gas accumulations for the play was not quantitatively assessed. The overall area of the play covers approximately 60,350 square miles (Magoon et al. 1996). A total of 4,180,072 acres of the play are contained within the planning area.

#### 7. Endicott Play

The Endicott Play is a hypothetical play comprised of both structural and stratigraphic traps in sandstone reservoirs within the Mississippian-aged Kekiktuk Conglomerate. Reservoir rocks are comprised of fluvial to shallow-marine quartzose sandstone and conglomerate within the Kekiktuk Conglomerate. Porosity is estimated to be less than 10 percent. Source rocks include coal and lacustrine shale within the Kekiktuk and marine shale in the Kayak Shale. The overall area of the play covers roughly 57,000 square miles (Magoon et al. 1996). A total of 4,180,072 acres of the play are contained within the planning area.

#### 8. Western Thrust Belt Play

The Western Thrust Belt Play is a hypothetical oil and gas play that consists primarily of structural traps in Mississippian and Pennsylvanian carbonate reservoirs in the Brooks Range fold and thrust belt. Reservoir rocks include greywacke sandstone of the Jurassic and Cretaceous and fractured chert and silicious shale of the Mississippian and Jurassic. A potential source rock is the marine shale of Mississippian to Cretaceous age. Traps in the play

are large anticlinal structures composed of multiple thrust sheets of carbonate rocks. According to Magoon et al. (1996), undiscovered oil potential projects between 1 and 45 accumulations of one million barrels or more; undiscovered gas occurrences could result in 10-150 accumulations with a calculated mean of 278.1 billion cubic feet; and total play area covers approximately 16,000 square miles (Magoon et al. 1996). A total of 2,472,913 acres of the play are contained within the planning area.

### *(2) Coal*

All or parts of five coal fields reside inside the planning area, as shown on Map 3-28. A coal field as defined in this document is an area that has high resource potential and contains one or more known coal beds of mineable thickness and quality. This does not imply that coal within these fields is economical to mine. There are currently two preferential right coal leases in the planning area. Both are 10-year leases and were issued in 1999.

Coal is classified by rank in accordance with the standard specifications of the American Society for Testing and Materials. Coal in the planning area ranges the entire spectrum of rank from lignite to anthracite. The predominant type is subbituminous to bituminous. It is likely that some of these coal resources will be developed within the next 15-20 years.

#### (a) History and Development

Two Federal coal leases were issued in the planning area in 1999 in the Beaufort Field. Both leases were issued as a result of the Preference Right Lease Application, which meant that a discovery of coal was made through a prospecting permit issued prior to August 4, 1976. These preferential right leases will terminate in 10 years without diligent development. Currently, the two leases are not producing coal.

**1. Cape Beaufort Field**

The Cape Beaufort Field is located on the northern coast of Alaska east of Cape Lisburne to the Kukpowruk River south of Point Lay. Most of the coal within the Cape Beaufort Field is from the Nanushuk Group of Early to Late Cretaceous age and bituminous in rank.

**2. Lisburne Field**

The Lisburne Field runs from Niak Creek, five miles south of Cape Lisburne, 45 miles south to Cape Thompson. The Mississipian-age Kapaloak Formation coals are high quality semi-anthracite in rank. The average coalbed thickness does not exceed four feet. The structural complexity of the area makes it difficult to determine a resource estimate for the field.

**3. Kukpowruk Field**

The Kukpowruk Field is located northeast of Deadfall Syncline in the Cape Beaufort Field toward the western boundary of NPR-A. Composition and quality of the coal is similar to that of Beaufort Field coal. Coal seams vary from 1-22 feet in thickness and are oriented horizontal to vertical depending on the location. Strippable reserve estimates are 20 million short tons for Kukpowruk Field. Total estimated resources are approximately three billion short tons (Merritt 1988).

#### 4. Chicago Creek Field

The Chicago Creek Field, also known as the Kugruk River Field, is located on the northwestern part of Seward Peninsula and occupies an area of less than 40 square miles (Merritt 1986). The coal field lies in a north-south trending linear trough that may be as great as two miles wide. Identified resources of the Late Tertiary lignite are 4.7 million short tons within 300 feet of the surface.

#### 5. Kobuk Basin (East and West Kobuk Fields)

The Kobuk Basin is comprised of the East and West Kobuk Fields and several other coal occurrences. Most exposures are located along the drainages within the basin including the Singauruk River, Hunt River, lower Ambler River, lower Kogoluktuk River, and the Lockwood Hills. The coals are mid to late Cretaceous and bituminous in rank. Coal seams tend to be less than three feet thick.

## *(3) Geothermal*

Geothermal energy consists of heat stored in rocks, and, to a lesser extent, in water or steam-filled pores and fractures. Water and steam transfer geothermal heat by convection to shallow depths within the earth's crust. This heat may then be tapped by drilling. Geothermal heat may also escape at the surface in geysers, thermal springs, mud volcanoes, and vents (usually volcanic) called fumaroles.

Geothermal leases are issued through competitive bidding for Federal lands within a Known Geothermal Resource Area (KGRA), or are issued noncompetitively for Federal lands outside of a KGRA. KGRAs are areas where the BLM determines that persons knowledgeable in geothermal development would spend money to develop geothermal resources. Pilgrim Hot Springs is a KGRA, one of three in Alaska, and the only KGRA in the planning area.

In addition to the KRGA, the DGGS (Motyka et al. 1983) has identified within the planning area a "region favorable to the discovery at shallow depth (less than 1,000 meters) of thermal water of sufficient temperature for direct heat applications." The area includes 11 hot springs and extends from Pilgrim Hot Springs in the southwest to Serpentine Hot Springs in the northwest, then east across the Seward Peninsula to Hogatza, then southwest to Norton Bay and west to Pilgrim Hot Springs. This area is shown on Figure 9 in the Leasable Mineral Occurrence and Development Report (BLM 2005n).

### (a) History and Development

Pilgrim Hot Springs, formerly known as Kruzgamepa Hot Springs, is located on the Seward Peninsula approximately 40 miles northeast of Nome and one-third of a mile south of the Pilgrim River. Access is by air to a small, gravel airstrip or by four-wheel drive vehicle. The Nome-Taylor Highway is seven miles to the east. The hot, saline water rises to the surface in an abandoned river channel within the Pilgrim River valley. The springs area has a sandy surface soil and is permanently thawed by the hot water. Water temperature averages roughly 156° F, with a maximum of 190° F. The water runs clear with only a slight odor of hydrogen-sulfide (USGS 1971).

Two 164-foot test wells were drilled in 1979 with artesian aquifers encountered between 66 and 98 feet. In 1982 Woodward-Clyde Consultants drilled four additional test wells as well as perforated and tested the two previous wells. The four wells were drilled within a temperature

contour where soils at a 15-foot depth exceeded 140° F. By conducting analysis based on downhole data, a heat source was located near a depth of 4,875 feet. A fracture has been determined as the conduit that carries the superheated water vertically from 4,875 feet to a depth of 50 feet (Economides 1983). The water then enters an aquifer system and seeps to the surface (Woodward-Clyde Consultants 1983).

### (b) Occurrence Potential

Potential geothermal resources in the planning area may be found in a swath that extends along the entire western part of Seward Peninsula narrowing to the east-northeast and the Purcell Mountains. There are six thermal springs within the planning area. Thermal springs are produced by subsurface hydrothermal systems, which transfer heat to the surface through fluids as opposed to transferring heat through solid rock.

### (c) Development Potential

Currently, there is no production from Pilgrim Hot Springs. The development potential is low, but could rate higher if there is an increase in demand for alternative energy sources. The geothermal resource at Pilgrim Hot Springs could provide power to Nome or aid in mineral development on the Seward Peninsula. Powerlines could be routed through the Cobblestone River Valley, crossing the Kigluaik Mountains at Mosquito Pass then south to Jensens Camp before following the road back to Nome. Distance is about 55 miles (Economides 1983).

## *(4) Coalbed Natural Gas*

Coalbed natural gas (CBNG) exploration in Alaska has been focused around the Matanuska-Susitna Valley in southcentral Alaska. Coalbed natural gas is gas composed primarily of methane that was produced by the coals during the coal-forming process and is held within the coals by hydrostatic pressure created by the presence of water. In order to produce coalbed natural gas, the pressure within the coal needs to be reduced to release the gas. This is accomplished by pumping water from the coals. Commonly the water is pumped to ground surface, but new technologies allow for the water and gas to be separated downhole. The gas naturally rises to the surface while the water is pumped further downhole to a deeper injection zone. The gas flows through the coals to the well bore where it is captured for use.

### (a) History and Development

Methane within coals has long been recognized as a hazard when mining the coals. It wasn't until the 1980s that coalbed natural gas was thought of as a potential reservoir target, even though producers often drilled through coal seams on their way to deeper targets. During the late 1990s coalbed natural gas production increased dramatically nationwide to meet the ever growing energy demands. Today coalbed natural gas accounts for 17 percent of total gas production within the United States.

The most likely location within the planning area for coalbed natural gas to occur is in the Colville Basin (as discussed under Oil and Gas on page 3-146). As many as 150 coal beds with thicknesses ranging from 5 to 28 feet, with a maximum of 40 feet, have been documented along the North Slope. The uplift of the Barrow Arch eroded many of the shallow coal beds to the north. Coal beds thicken to the south and outcrop more in the western part of the Colville Basin.

Currently, no coalbed natural gas wells have been drilled in the planning area; however, oil and gas wells drilled in the area show gas kicks in the shallow coal zones penetrated.

### (b) Occurrence Potential

Two factors indicate the potential presence of coalbed natural gas in a coal: 1) thick, laterally continuous subsurface coal deposits, and 2) thermal maturity (rank) of the coal. The only way to determine if coal contains coalbed natural gas is to drill and sample the coal. The Colville Basin is the most likely location within the planning are for coalbed natural gas because the basin contains thick, laterally continuous coals that are thermally mature (sub-bituminous to bituminous). The Colville Basin is ranked high for coalbed natural gas occurrence.

### (c) Development Potential

It is unlikely that interest in the western Colville Basin for commercial coalbed natural gas will increase over the life of this RMP; however, coalbed natural gas as a low-cost, alternative energy source for local village use may increase. This is especially true as oil prices continue to increase, causing the cost of not only purchasing diesel fuel to increase, but also the cost of transporting the fuel to villages.

INSERT 11x17 MAP
**3_26_mineral_leasing**

INSERT 11x17 MAP
**3_27_oilgas_basins**

INSERT 11x17 MAP
**3_28_coal**

# b) Locatable Minerals

## *(1) Mining-related Surface Disturbance and Reclamation Requirements*

Surface disturbing activities under the jurisdiction of 43 CFR 3809 regulations are reviewed on a case-by-case basis. Occupancy related to mining is regulated under 43 CFR 3715. The intent of the 3809 regulations is to prevent unnecessary or undue degradation of surface resources and to ensure reasonable reclamation of disturbed sites on Federal lands. The intent of the 3715 regulations is to ensure mining claim occupancy is on a level commensurate with and reasonably incident to the present level of the mining activity and remoteness of location of a particular claim or claims.

According to 43 CFR 3809, casual use employing non-mechanized equipment does not require notification to the BLM. Submission of a notice is required 15 days prior to any surface-disturbing exploration activities using mechanized equipment or explosives when the cumulative disturbance is less than five acres. Notices and casual use are not Federal actions and thus do not require environmental analysis or approval by the Authorized Officer (AO). Notices are reviewed and measures applied (standard stipulations) to prevent unnecessary or undue degradation. Production activities or exploration activities disturbing more than five acres require a Plan of Operations, Reclamation Plan, and environmental analysis. Plans of operations require specific approval by the BLM prior to commencing work. Construction of new access requires consultation with the AO.

Notices and plans of operations are filed using the State of Alaska's Alaska Placer Mining Application (APMA) form submitted to the ADNR, Division of Mining Land and Water (Map 3-30). By Memorandum of Agreement these filings are distributed by the State to all agencies involved in the regulation of mining activities. While the State does not require bonding for mining activity under five acres, new notices and plans on Federal mining claims must be bonded regardless of acreage of disturbance or proposed disturbance. The BLM accepts bonding through the Statewide Bond Pool, a reclamation bonding program administered by the State. Ongoing notice of operations are grandfathered and not required to conform to Federal bonding regulations.

The BLM is required to conduct inspections at least once a season on notices and twice a season on plans of operations to ensure compliance and to check for unauthorized use. Generally there is no road access to mining operations in the planning area. Inspections are carried out by OHV, fixed-wing aircraft, or helicopter support.

Under notices of operations, operators reclaim their surface disturbance at the end of the mining season except for the camp footprint and other improvements such as tailing ponds and bypasses that will be utilized in the following season's operations. Seasonal shutdown is dictated by Alaska's climate. If un-reclaimed acreage is left to accumulate beyond five acres, the mining activity is moved into the plan category, which then requires an environmental assessment, BLM-approval to operate, and reclamation bonding, if not already bonded. The filing of multi-year plans is acceptable to the BLM.

After filing and reclamation requirements were instituted in 1980, the number of filings rose steadily to a high of 34 notices and 10 plans in 1984 within the present-day planning area, and declined almost as quickly. By 1997 the area was carrying 13 notices and four plans. Each year one to two new notices would start up and the same number or greater would be closed out. For the past three years BLM has been left with one active notice and three inactive/abandoned notices/unapproved occupancies along with one inactive plan and one plan level record of non-compliance and unapproved occupancy.

### *(2) Mining Claim Occupancy*

Regulations found at 43 CFR 3715 state “The purpose of this subpart is to manage the use and occupancy of the public land for the development of locatable mineral deposits by limiting such use or occupancy to that which is reason-ably incident. The BLM will prevent abuse of the public lands while recognizing valid rights and uses under the Mining Law of 1872 and related laws . . .”

These regulations were enacted in 1996 to prevent occupancy of public land under the guise of mining when no justifiable reason or significant amount of mining is occurring. The occupancy must be “reasonably incident to mining” (not undue or unnecessary) and the occupancy must be needed to sustain regular work, to protect property, or other justifiable reason. It must also lead to the extraction and beneficiation of minerals, involve observable activity and use appropriate operable equipment. Generally, if adequate housing within a reasonable distance is available the occupancy is not justified (unless property must be protected). These regulations have proved difficult to apply in Alaska where mining claims are remote, inaccessible, and seasonal shutdown is dictated by the severe climate.

BLM has four types of enforcement actions it takes under the regulations found at 43 CFR 3715. These include: 1) immediate suspension, 2) cessation order, 3) notice of non-compliance, or 4) other (if the occupancy is not incidental to mining, an application for use under another regulation may be required, and trespass under a different regulation may be pursued).

### *(3) Other Factors Affecting the Development of Locatable Mineral Resources*

#### (a) Land Ownership

Major landowners within the planning area include three regional Native corporations, the State, the Federal government, and privately owned lands (primarily patented mining claims). Federal ownership is subdivided into National Park Lands administered by the NPS, Wildlife Refuges managed by the FWS, and public domain lands administered by the BLM. A significant amount of the BLM-managed lands remain in selected status awaiting conveyance to the State or Native corporations. Both the State and the regional Native corporations recognized the value of retaining potentially valuable mineral deposits and made their selections accordingly. Only since 1980 when the BLM instituted requirements to file mining plans and notices of surface disturbing operations related to mining development and instituted reclamation requirements did the effectiveness of this selection strategy employed by the State and Alaska Natives become apparent. Filings received by the BLM were consistently on lands under selection and interim management by the Federal government.

Of the 30.5 million acres within the planning area, approximately 16 percent (5.0 million acres) are managed by the BLM. Most, but not all, of these lands are open to mining (Map 3-29). An additional 17 percent (5.3 million acres) have been Tentatively Approved (TA'd) or patented to the State and are open to mining under State Statutes. Selected lands (both State- and Native-selected) account for 27 percent of the planning area (8.1 million acres). Mining (under Federal jurisdiction may occur on selected lands where Federal mining claims were located prior to withdrawal for selection purposes under ANCSA. Most of these lands will go to the selecting entity, but, because of overselections, some will come back to Federal management. FWS, NPS, and military lands, comprising 21 percent of the planning area (6.4 million acres), are not open to mining. Private lands (including interim conveyed Native lands) account for 19 percent of the planning area; some of these lands may be open to mining at the discretion and terms of the Native corporation or private landowner. In summary, approximately 60 percent of the lands in the planning area (BLM-managed, selected lands, and State lands) are conditionally open to mining. Some mining on private land (19 percent) could be permitted at the discretion of the landowner. At least 21 percent of the planning area under management of the NPS, FWS, and the Military are closed to mining.

### (b) Mining Claim Status

On unpatented Federal mining claims on lands conveyed to Native corporations it was left to the Native corporation and the claimant to determine what rights the claimant would retain under the new land owner. For unpatented claims on lands TA'd or patented to the State, the claimant had the option of converting to State mining claim or protesting the conveyance and remaining a Federal claim under Federal jurisdiction. Initially most claimants retained their Federal status as Federal claims, keeping the right to go to patent. A moratorium was placed on the ability to file for patent in 1995 and has remained in place since. This has led to overstaking of State claims by claimants of their Federal mining claims on TA'd, and even selected lands and filing of requests for priority conveyance of these lands to the State. These actions, combined with a requirement in 1994 of $100/claim annual rental fee paid to the Federal government resulted in a large decrease in the number of active Federal mining claims.

### (c) Mineral Assessment Efforts

Following the gold rushes at the turn of the nineteenth century, the pace of mineral development slowed due to the lack of developed infrastructure, changing economic conditions, world wars, and political factors introduced by the passage of ANCSA in 1971 and ANILCA in 1980. These two legislative acts closed hundreds of thousands of acres to further mineral exploration and development other than a few active mineral development operations which immediately preceded the passage of the ANCSA in 1971 and were grandfathered in. The last major attempt to assess the mineral potential of the region (limited to the Seward Peninsula) was done by the Mineral Industry Research Lab of UAF in 1966. Due to the complex land ownership pattern and political restrictions on further development activities on these lands, exploration and development have been limited largely to private lands, mostly mining properties patented in the early 1900s and Native lands conveyed early in the process. In recent years, interest has increased, due to the State's conduct of airborne geophysical surveys of State land and adjoining Federal land. Only since 1995, have mineral development interests been encouraged by the State's conduct of airborne geophysical surveys on these lands.

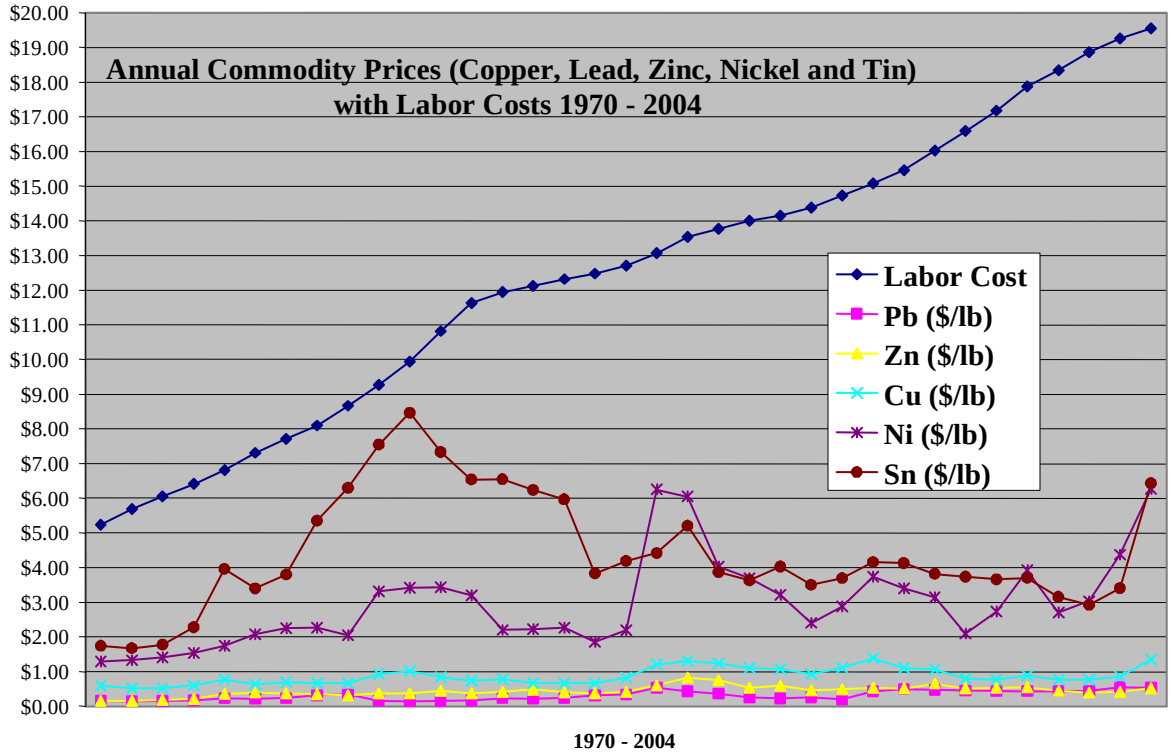
In the fall of 2004 the BLM wrote a Mineral Occurrence and Development Potential Report (BLM 2005f) and let a contract to the Alaska Division of Geological and Geophysical Surveys (ADGGS) to update and review the currently available data on mineral resources in the planning area. Once the mineral potential report was finalized, a Reasonable Foreseeable Development

Scenario (BLM 2005g) was written to address the likelihood that a particular mineral occurrence is likely to be explored or developed within the next 10-15 years.

### (d) Commodity Prices and the Business Cycle

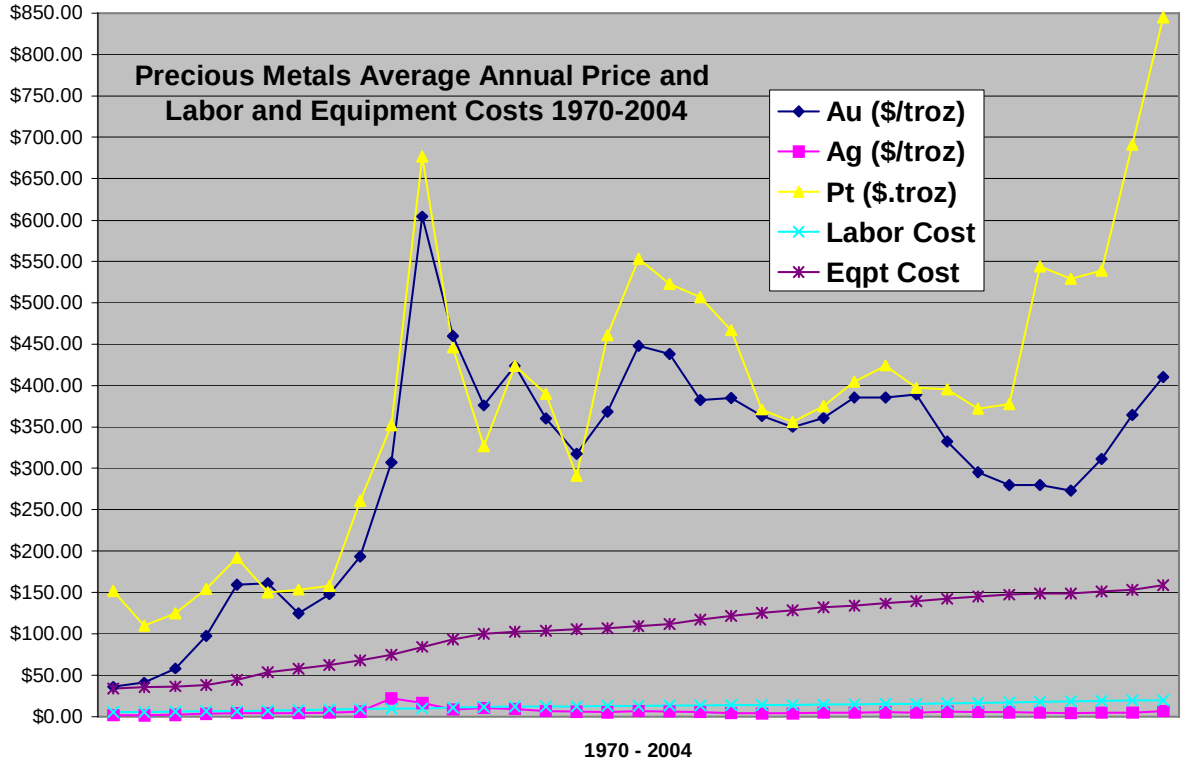
Mining activity at its most elemental level is predicated on metals commodity prices and perceived trends based on historic records. Throw into this mix the speculation factor, uncertain land status, an increasingly strict domestic regulation climate, and the high capital cost of going to production, and mining becomes a high risk industry. From 1989 to present is a relatively short period of time to say much about commodity trends particularly when the price graph is fraught with large, short duration peaks and valleys.

**Figure 3-3. Base Metal, Nickel, and Tin Prices and Labor Costs 1970-2004**




Commodity prices of particular interest in the region from around 1970 onward generally increase at about the same rate or somewhat less than the inflation rate (cost of doing business). This is particularly true for base metals (copper, lead, and zinc), as well as for nickel, though, as the graph illustrates, there are more upward and downward short duration spikes.

**Figure 3-4. Precious Metal, Labor, and Equipment Costs 1970-2004**




Precious metals, gold and silver, prices show a sharp upward spike around 1980 and then drop precipitously around 1985 where they have leveled off. Likewise the price of tin with its 10-year steady upward climb to peak in 1980 shows a relentless decline with a sharp downward spike in 1985, marking the end of the International Tin Council which had been successful in stabilizing tin prices worldwide since 1921.

In Alaska, and in this region in particular, remote locations and lack of infrastructure to bring in mining equipment and transport the mineral commodity to market limits development and production to only the unusually large (on a world wide scale) mineral deposits. Even that limited development has been predicated on assistance from State development oriented programs such as Alaska Industrial Development Authority, special congressional legislation that excluded mineral deposits from in Federal enclaves that preclude mineral development, and in the case of Native lands, the desire of the Alaska Natives of the region to develop mineral resources as a source of jobs and a cash economy. Outside this, the "smaller" mineral deposits go begging and are traded from one mineral exploration company to another on a four to five year cycle. Many of these smaller desposits would be a mineable deposit in the Lower 48 where infrastructure (roads, rails, ports, and power) is already in place.

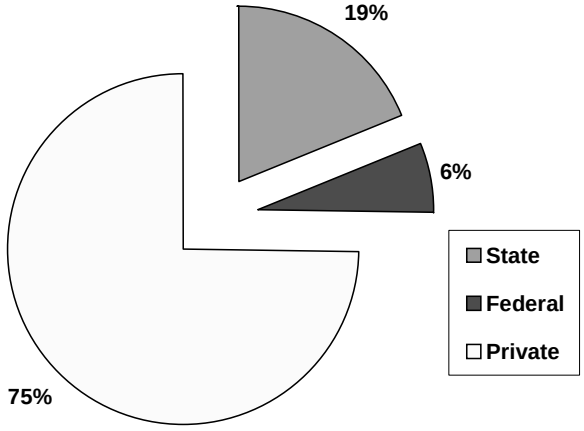
### *(4) Recent Activity*

There is no one universally agreed upon way to gauge or characterize the level of mining activity and mineral potential of a region. The ADGGS sends out an annual survey form, the results of which are used to tabulate in both narrative and tabular form such things as

expenditures for exploration, development, and mining as well as annual production and new claim location numbers by quadrangle. The data from these survey forms is generalized for publication into broad geographic areas to maintain confidentiality of individual respondents. Since gold and other mineral commodities are bought and sold on the open market, there is no requirement to report production. Publicly traded companies are required to report their activities to the Securities and Exchange Commission but this information is not tabulated, published, or made readily available to the public. Daily commodity spot prices are available in the newspaper and selected trade journals. Commodity prices are tabulated and current as well as historical prices are readily available on the internet. For example the monthly average spot price of a commodity could be charted over a period of years (5 years, 10 years, or 20 years depending on what the researcher considers a complete business cycle) to forecast long-term growth or decline. This, however, is a simplistic approach as it does not take into account numerous other factors unique to a geographic mining region. Such things would include cost of equipment and supplies, availability of access, cost of transportation and labor, and labor supply to name a few. Information on numbers of mining claims staked and mining claims relinquished can be obtained from Federal and State land management agencies, particularly the ADNR Division of Mining, Land and Water for State claims as well as the BLM for Federal mining claims. These figures are not generally tabulated but can be researched from the public records.

Another type of approach, the one adopted here, is through a recent database put together by the State that tracks specific information fields found on the APMA. The location and level of recent activity is gauged by filings of mining notices and plans of operations from 1982 through the 2004 mining season.

**Figure 3-5. Summary of Mining Surface Disturbance (excluding Red Dog) by Land Ownership in the Planning Area**

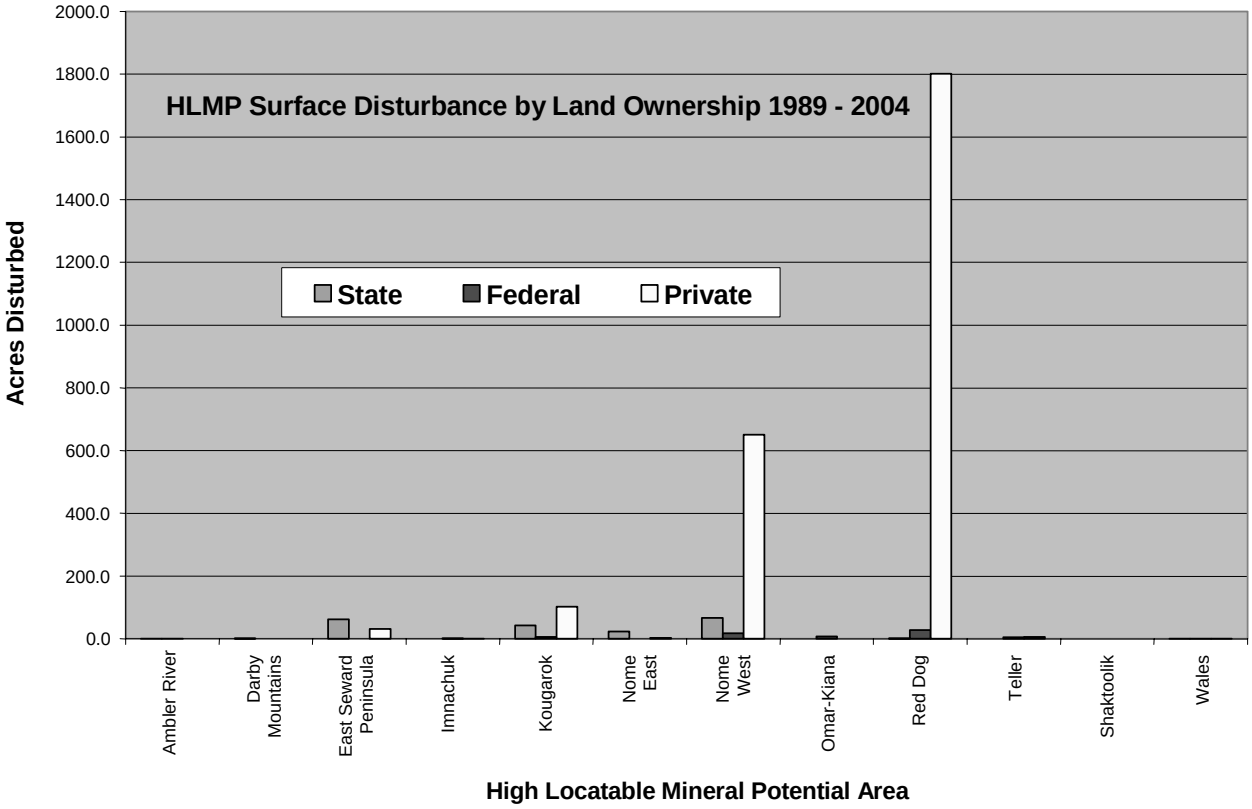



This database was obtained from the ADNR land records and converted to a to a shape file for use in ArcGIS. What this database does not capture are mineral exploration programs initiated by regional Native corporations on Native-selected lands. These programs are permitted by the BLM under interim management policies by miscellaneous land use permits as selected lands are not open to mineral entry and location. This is a relatively minor issue as there have been less than a half dozen of these permits issued since 1982 and lands conveyed to the Native corporation may or may not be available to mineral exploration and development depending on the determination of the landowner. The pie chart in Figure 3-5 excludes the 1,800 acres

currently impacted at the Red Dog Mine. Inclusion of this acreage would dramatically skew the percentages in favor of private development, with State at 7 percent, Federal at 2 percent, and private at 91 percent.

In the following narratives that describe the management situation of each of the high locatable mineral potential (HLMP) areas, mining activity highlights are taken from the State's annual publication that summarizes, by broad region, the questionnaires sent out to mining interests operating in the state. For surface disturbance acreages by land status and creek drainage the following narrative incorporates information from the geo-referenced APMA database, BLM land status records, and the Mineral Occurrence and Development Potential Report for Locatable and Salable Minerals (BLM 2005f). The HLMP areas are grouped by geographic location. Each area summary consists of a section summarizing land ownership, mineral deposit model characterization, and a summary of recent activity in the area.

**Figure 3-6. HLMP Surface Disturbance by Land Ownership 1989-2004**




Note: See also Table 3-17 showing HLMP acreage by land ownership.

**Table 3-17. HLMP by Land Ownership**

| HLMP | State Acres | Federal Acres | Private Acres |
|---|---|---|---|
| Ambler River | 1.0 | 0.7 | 0.3 |
| Darby Mountains | 2.0 | 0.0 | 0.0 |
| East Seward Peninsula | 62.4 | 0.0 | 32.0 |
| Imnachuk | 0.0 | 2.0 | 1.0 |
| Kougarok | 43.5 | 6.5 | 102.6 |
| Nome East | 23.0 | 0.0 | 2.7 |
| Nome West | 67.2 | 17.5 | 650.4 |
| Omar-Kiana | 0.0 | 7.0 | 0.0 |
| Red Dog | 2.5 | 28.2 | 1801.3 |
| Teller | 0.0 | 5.0 | 6.5 |
| Shaktoolik | 0.0 | 0.0 | 0.0 |
| Wales | 1.0 | 1.0 | 1.0 |
| | 202.6 | 67.9 | 2597.8 |

Note: See also Figure 3-6 showing HLMP surface disturbance by land ownership from 1989 to 2004.

The State's APMA database contains many duplicate records that had to be sorted manually and consolidated. For a single application and permit each applicant and each section of a township applied for is entered as a separate record. In the following tables, the land status column represents land status of the lands underlying the mining activity at the time of filing. The next column is the estimated surface disturbance acreage anticipated by the operator or claimant for that season. In some instances the application is merely a paper filing, meaning that the applicant makes application to disturb a certain acreage but never gets out on the ground. In following years, the same applicant may submit the same acreage and again fail to do the work. It is not possible to tell from the database when or how often this occurs. The next three columns break out actual surface disturbance according to whether the activity occurred on State mining claims, Federal mining claims (on public domain lands or tentatively approved State lands where claimant chose to retain the Federal mining claim) and private lands (mostly patented mining claims or on conveyed Native lands). These numbers are also generated by the applicant for the purposes of reclamation bonding and but are verified by the Federal or State jurisdictional agency. As the APMA data input is generated by the claimant or operator and not closely verified in the field, the accuracy of any individual number is suspect, but summary data does provide a useful tool to describe general activity levels and trends of areas under management of Federal and State mining regulators and accurately reflect the ongoing management situation.

Based on surface disturbance acreages tabulated by HLMP the most active areas are, in order, the Red Dog, Nome West, and the Eastern Seward Peninsula areas. The top two areas, mining activity is very nearly exclusively limited to private lands. The acreages in these two areas represent the Red Dog Mine on conveyed Native lands and the Alaska Gold Company's dredging and open pit operations on patented Federal mining claims. The third most active area, Eastern Seward Peninsula, the activity has occurred on State lands. The activity on Federal mining claims represents mining plans and notices that were filed on Federal claims on State-selected lands. In no areas where significant mining activity has occurred in the past 16 years has mining occurred primarily on Federal lands.

Mineral resource development and mining since 1989 in the planning area has occurred primarily on private lands and secondarily on State lands. This can be attributed to the patenting of large numbers of Federal mining claims staked during the gold rush era and to the State and Native corporations targeting of mineral resources for selection under ANCSA.

## *(5) Potential Areas*

In the following sections, the term BLM land refers to public domain land, excluding selected lands. Although State- and Native-selected lands are still BLM land, they are segregated from mineral entry.

### (a) Northern Seward Peninsula Region

Some of the oldest rocks (Proterozoic to middle Paleozoic) in the planning area are limestone and shale units thought to represent continental shelf and marine slope sediments originally deposited along the passive margin of North America. These rocks are similar in composition and age and are thought to have been deposited as a single belt including the Arctic Alaska and Seward lithotectonic terranes. The Northern Seward Peninsula Region includes the following high locatable mineral potential areas: Wales, Shishmaref, Kougarok, and Imnachuk.

#### 1. The Wales HLMP Area

From 1989 through the 1991 mining season three locations in the area were filed for under the APMA process. On Cape Creek one acre was recorded in 1989 for surface disturbance on unpatented Federal mining claims overlying Native-selected lands. This placer tin mining operation was quite successful in the late 1970s and 1980s and received patent in 1983 to most of their Federal claims on which they were working. This operation used a dragline to strip the overlying creek gravels, a dozer to push up tin bearing gravels, and a loader to tram these gravels to a slusher pile which fed an elevated combination sluice and jig wash plant. Tin concentrates (up to 70 percent tin) were packed in 55 gallon drums weighing approximately 1,500 pounds each and the drums lightered by a landing craft to offshore barges for transport to Seattle, Washington, and then overland to a smelter in Texarkana, Texas. The second location was filed on by Kennecott Exploration in the area around Potato Mountain to evaluate the hard rock tin and gold potential on selected Native lands. The third location filed on by Placer Dome, Inc. was filed for the Lost River area in support of an ongoing mineral patent examination of lode mining claims. A core drill was set up in one location to target a geophysical anomaly on one of the claims under patent application. Surface disturbance for each of these two location was estimated at one acre each and listed as Federal lands (Federal mining claims at the Lost River location) though the underlying lands were actually Native-selected lands and conveyed Native lands, respectively. There are no BLM-managed or State-selected lands in this HLMP.

**Table 3-18. Wales HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cape Ck | Teller | C-6 | Mining | 1989 | | Federal Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Potato Mountain | Teller | C-6 | Exploration Hardrock | 1990 | | Private Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lost River | Teller | B-5 | Exploration Hardrock | 1991 | | Private Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: St = State; Fed = Federal; Pri = private; dst = disturbance; Cr = creek; no entry in the Last Year column means operations only lasted for 1 year.

Mining of placer tin from Cape Creek continued in 1989 and ceased operations thereafter, presumably due to declining resources available and soft price of tin. This small Alaskan corporation has mined on this drainage nearly continuously since 1969. The core of this claim block is patented Federal mining claims. Prior to that the area of Cape Mountain and Cape Creek was mined sporadically since 1935 for both hard rock and placer tin resources. In 1990 Kennecott Copper Corporation undertook to conduct hard rock mineral exploration on Native lands around Potato Mountain to evaluate the hard rock tin potential of the tin granite there. The third operation, by Placer Dome US was the drilling of an unpatented mining claim at Lost River in support of a mineral patenting application. In addition, though APMA records are not available prior to 1989, hard rock exploration is also known to have occurred on State and Native lands west of Baltuk Creek.

Unique to Alaska and North America, mineral interests in this area are tied to the price of tin. Cape Mountain, Tin Creek, and Lost River are the only locations in North America where significant quantities of tin have been produced as the primary product. Also USGS commodity summaries report that unique to tin has been its long history of commodity "agreements" dating back to 1921. These agreements were usually structured between producer countries and consumer countries on a complex global basis. Through these agreements the International Tin Council (ITC) supported the price of tin during periods of low prices by buying tin for its buffer stockpile and was able to some degree to restrain and partly take advantage of the historically high tin prices. The sharp recession of 1981-82 proved to be quite harsh on the tin industry. The ITC was able to avoid truly steep declines through accelerated buying for its buffer stockpile but eventually reached its credit limit in late 1985. This long standing "agreement" process then collapsed. Beginning In 1973 the price of tin (USGS Minerals Yearbook summary) climbed from the $2.00 per pound price toward a peak of $8.46 per pound in 1980. Mining activity in the area flourished. From 1981 to 1985 tin prices slowly declined and dropped sharply below $4.00 per pound in 1985. There was a brief rebound taking the price above $5.00 per pound and since then the price has flattened to around $4.00 per pound. From 1989 to 2004 tin prices drifted from just under $4.00 per pound to a low of $1.95 per pound, rebounding to $4.12 per pound in 2004. In this area developed resources were mined out during the late 1970s to late 1980s and current commodity prices and trend have apparently not been sufficient to encourage further significant exploration or development.

**Mining Activity Highlights**

- In 1989 tin production dropped, Lost River Mining Co., Cape Creek Mine dropped off 35 percent (180,000 pounds). One of the largest producers of tin in the United States for the past 15 years exhausted their reserves and dismantled operations.
- In 1989, BSNC Lode tin exploration Cape Mountain, Potato Mountain, Brooks Mountain, Lost River, and Black Mountain. Gold veins around Rock Creek and Mount Distin.
- For the 1990 mining season Kennecott Exploration drilled two holes on the Potato Mountain tin deposit.
- In 1993 Lost River Mining trenched for more tin on Cape Creek.

### 2. Shishmaref HLMP Area

There is no recent activity or APMA filings for the Shismaref HLMP area. This area contains tin granite intrusives whose lode potential was explored in the early 1900s but never developed like the Cape Mountain Deposit, presumably due to the distance to tidewater and lack of transportation access. Placer tin possibilities also exist and mining occurred on creeks draining Ear Mountain in the early 1950s but did not continue, probably due to increasingly unfavorable economics after World War II. There are no BLM or State-selected lands in this HLMP.

### 3. Kougarok HLMP Area

There are no BLM lands in this HLMP area. There is an isolated tract of State-selected land, approximately one township in size, containing no known, significant mineral deposits in the middle of the area and at the eastern protrusion of this HLMP area. The eastern protrusion of State-selected lands are located in the Boulder area, upland tributaries west of the Noxapaga River. In addition there are some square mile sized parcels of Native-selected lands at the south end of the area. They do not contain any known, significant mineral deposits.

Over a 16-year period from 1989 through 2004, mining and mineral exploration, exclusively for placer gold, has occurred over a total acreage of at least 145.9 acres (171.0 acres applied for but only 145.9 can be strictly accounted for) of this high mineral potential area. By land ownership this acreage breaks down into 36.8 acres State land, 6.5 acres Federal land within unpatented Federal mining claims, and 102.6 acres of private land (patented mining claims). Most of this mined acreage is on Washington Creek and the Kougarok River and mined by a family-operated 2.5 cubic foot bucket-line dredge. Prior to these Federal mining claim being patented these claims were located on State-selected lands. The remaining operations in this area are bulldozer-loader-wash plant operations in open cuts along river and creek flood plains operated by individuals and small, independent Alaskan mining companies.

## Table 3-19. Kougarok HLMP Surface Disturbance Summary

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Washington Ck | Ben | C-6 | Suction Dredge | 1989 | 1997 | Federal & Private Land | 19.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Macklin Ck | Ben | D-6 | Mng/Expl/Let Intent | 2000 | 2003 | State Land | 0.0 | 6.0 | 0.0 | 0.0 | 6.0 |
| Skookum Ck | Ben | B-5 | Mng/Expl/Let Intent | 1992 | | Federal Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Black Ck | Ben | C-5 | Mng/Expl/Let Intent | 1992 | 1993 | Federal Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Coarse Gold | Ben | C-6 | Mining/Exploration | 1989 | 1990 | State Land | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dick Ck | Ben | D-6 | Mng/Expl/Let Intent | 1989 | 2004 | State Land | 23.0 | 21.0 | 0.0 | 0.0 | 21.0 |
| Boulder Ck | Ben | B-5 | Mng/Expl/Let Intent | 1989 | 1993 | Federal Land | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Noxapaga R | Ben | C-5 | Expl/Let Intent | 1995 | 2004 | Federal Land | 4.0 | 0.0 | 5.0 | 0.0 | 5.0 |
| Humbolt Ck | Ben | D-5 | Mng/Expl/Let Intent | 1994 | 1993 | Federal Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Auburn Ravine | Sol | D-5 | Exploration | 2001 | | State Land | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| Boulder Ck | Ben | C-5 | Expl/Let Intent | 1993 | 2004 | Federal Land | 0.0 | 0.0 | 1.5 | 0.0 | 1.5 |
| Garfield Ck | Ben | B-5 | Exploration | 2001 | 2004 | State Land | 1.0 | 4.5 | 0.0 | 0.0 | 4.5 |
| Kougarok R | Ben | C-6 | Expl/Let Intent | 1990 | 1994 | State & Federal Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kougarok R | Ben | B-6 | Mng/Expl/Let Intent | 1990 | 1994 | State & Federal Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kougarok R | Ben | C-6 | Exploration | 1990 | | State Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kougarok R | Ben | B-6 | Expl/Let Intent | 1997 | | Private Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kougarok R | Ben | C-6 | Expl/Let Intent | 2000 | | State Land | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| Kougarok R | Ben | C-6 | Mining/Let Intent | 1989 | 2004 | State/Fed/Priv Land | 89.0 | 0.0 | 0.0 | 93.3 | 93.3 |
| Arctic Ck | Ben | C-6 | Exploration | 1990 | | State Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Atlas Ck | Ben | B-6 | Mng/Expl/Let Intent | 1995 | | State Land | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Harris Ck | Ben | C-6 | Expl/Let Intent | 1995 | | State Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Coffee Ck | Ben | B-6 | Expl/Let Intent | 1995 | 2001 | Private Land | 1.0 | 0.0 | 0.0 | 0.7 | 0.7 |
| Coffee Ck | Beaver | B-6 | Mng/Expl/Let Intent | 1993 | 1999 | Private Land | 16.0 | 0.0 | 0.0 | 8.6 | 8.6 |
| Quartz Ck | Ben | B-6 | Expl/Let Intent | 1996 | 2006 | State & Private Land | 4.0 | 6.8 | 0.0 | 0.0 | 6.8 |
| Windy Ck | Teller | C-1 | Expl/Let Intent | 1998 | | State Land | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 |
| Windy Ck | Ben | B-6 | Exploration | 2000 | 2004 | State Land | 2.0 | 4.5 | 0.0 | 0.0 | 4.5 |
| Star Ck | Teller | C-1 | Exploration | 2001 | 2005 | State Land | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 |

Abbreviations: St = State; Fed = Federal; Pri = private; dst = disturbance; Ck = creek; R = river; Ben = Bendeleben; Sol = Solomon; Expl = exploration; mng = mining; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

In Table 3-19, there are multiple entries for the same drainage. This is due to the fact that each row of the table represents a separate APMA filing and there are multiple operations on the same drainage. Between 1989 and the present, 27 separate mining operations, mostly for placer gold resources were in operation on 18 creeks and rivers in this area. Five of these owner/operators can be categorized as small Alaskan corporations. These include N.B. Tweet and Sons, Goldstream Exploration, LLC Lohman Mining and Commercial Company, Thurman Oil and Mining Inc., and Navigator Exploration Company. The remaining operations were conducted by individuals as small family businesses. Except for the small bucket-line dredge operating on the Kougarok River below Taylor, mechanical mining consisted of small to medium size open cut mining using elevated wash plants fed by dozers and loaders. The largest mining operation, the bucket-line dredge, is reported to have mined 93 acres between 1989 and the end of the 2004 season, just less than six acres per year. The remaining operations disturbed 1-10 acres over their permitted lifetime or about 1.5 acres per year. Except for Black, Skookum, and Boulder creeks, mining operations were conducted on State and private lands. Once Federal mining claims on the upper Kougarok River were patented in the early 1990s their status changed to private lands. Humbolt Creek is located within the Bering Land Bridge National Monument and exploration activity there was for verification of discovery purposes as surface disturbing activities on NPS lands can only be permitted if discovery can be demonstrated. The level of activity documented between 1989 and present occurred during a declining commodity market. Unfortunately, placer mining application data are not available for the 1980s when the commodity market was booming, with the price of gold strongly spiking in 1982. The lode resources that contributed the placer values have not been explored in this region.

The upper Kougarok River and major tributaries were mined by bucket-line dredge since gold rush days and one dredge continues to this day on private lands. The Coffee Dome and Boulder town sites were busy through the 1980s and into the early 1990s. These operations consisted of small and medium size stationary wash plants processing materials from alluvial open pits.

**Mining Activity Highlights**

- In 1989 Kougarok Mining Limited conducted drilling in the middle reach of the Kougarok River.
- In 1990 and 1991, N.B. Tweet and Son and others continued to mine the upper reaches of the Kougarok River, Washington Creek, and Macklin Creek above the confluence of Henry Creek. This mining continued seasonally through 2004.
- In 2000 mining season Quaterra mining company staked State mining claims, Volcanogenic Massive Sulfide (VSM), in the area reported to be 110 miles northeast of Nome.
- In 2001, there was a lot of tin-tantalum exploration on the Seward Peninsula.
- In 2002, follow up core drilling of the tin-tantalum prospect in the Kougarok area 67 miles north of Nome was accomplished.

### 4. Imnachuk HLMP Area

This HLMP area contains no uncumbered BLM, State-selected, or Native-selected lands.

Between 1990 and 1992 mineral exploration, presumably for placer gold was conducted by a private individual on the Imnachuk River. Proposed surface disturbance was estimated to not exceed two acres. This exploration occurred on Federal mining claims on Native-selected

lands. These Federal placer mining claims were under mineral patent application filed by GEM Exploration, Inc. Interest in pursuing the application waned and in the mid 1990s the application lapsed. These lands have since been conveyed, and the mining claims have come under the jurisdiction of the NANA Regional Native Corporation.

**Table 3-20. Imnachuk HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inmachuk River | Ben | D-2 | Exploration Let Intent | 1990 | 1992 | Federal Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: St = State; Fed = Federal; Pri = private; dst = disturbance; Ben = Bendeleben; Let Intent = letter of intent.

Exploration for placer gold and test mining was conducted between 1990 and 1992 on unpatented Federal mining claims that were subsequently conveyed to the Native corporation at which point, mining interest ceased. The area is one of significant historical mining activity largely for placer gold values. In addition, exploration was done on hard rock base and precious mineral shows in the rocks of the valley hillsides. One old time miner worked into the 1980s using shaft sinking and drifting to mine placer resources until his death.

**Mining Activity Highlights**

- In 1991, Jack Hoogendorn continued his 17th year of underground mining of gold beneath Pliocene basalt flows in the Inmnachuk District.
- In 1991, NANA Regional Corporation through its partner Kennecott Exploration was active in lead/zinc/silver/gold exploration on its lands in the Imnachuk River District as well as the Candle and Ambler Mineral Belt. This work continued through the 1992 season. Exploration targeted the polymetallic mineral occurrences in the Imnachuk River area as well as in the Candle District.
- During 1992 NANA/Kennecott Exploration followed up on previous work which targeted polymetallic mineral occurrences in the Candle and Imnachuk areas.

### 5. Imnachuk Medium Locatable Mineral Potential (MLMP) Area

In 1996, Kennecott Copper Corporation conducted hard rock mineral exploration in the upland area between Chicago Creek on the Kugruk River and the Utica Landing area of the Imnachuk River (Virginia Creek as listed above) on NANA Corporation lands. Operations were conducted in partnership with the Native Corporation to assist in evaluation of mineral resources on these lands. Presumably the mineral occurrences here are related to the hard rock shows investigated by the placer miners of the Imnachuk MLMP area.

**Table 3-21. Imnachuk MLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Virginia Ck | Ben | D-1 | Exploration Let Intent | 1993 | 1996 | Private Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; dst = disturbance; Ben = Bendeleben; Let Intent = letter of intent.

Mining by bucket-line dredge and stationary wash plants on the alluvial flood plain was big in the 1930s and included some development of lode potential in the uplands of the drainage basin. Except for a single operator doing shaft mining this industry did not come back after World War II. The operator died in the early 1980s and these lands were conveyed to a Native Corporation, ending the active mining activities in this area.

**Mining Activity Highlights**

- In 1995, Kennecott Exploration/NANA conducted polymetallic and base metal exploration activities in the Deering area on Native lands.

## (b) Southern Seward Peninsula Region

Some of the oldest rocks (Proterozoic to middle Paleozoic) in the planning area are limestone and shale units thought to represent continental shelf and marine slope sediments originally deposited along the passive margin of North America. These rocks are similar in composition and age and are thought to have been deposited as a single belt including the Arctic Alaska and York lithotectonic terranes. The Southern Seward Pensinsual Region includes the following HLMP areas: Teller, Nome and Nome West.

### 1. Teller HLMP Area

There are no unencumbered BLM or State-selected lands in this HLMP. There are three isolated tracts of BLM land immediately adjacent to the HLMP. However, these BLM parcels do not contain any known, significant mineral occurrences.

The APMA database lists three locations that have been active for the 1991-2004 mining seasons: Alder Creek, Gold Run Creek, and Tuksuk Channel. No surface disturbance is listed for either Alder Creek (Federal land) or Tiksuk Channel (State land). A total of 10.5 acres is listed for suction dredging activities on Gold Run Creek, five acres on Federal mining claims and 5.5 acres on Native Corporation lands. This is however a misclassification of the actual land status. Federal mining claims were extinguished in 1996 and these lands were turned over to the land owner, Bering Straits Native Corporation. The claimant did not understand the change in ownership and continued to file as though he was still operating on Federal mining claims on Gold Run Creek. It is likely that much less than 10.5 acres on Gold Run Creek were actually suction dredged by the claimant or his lessees.

**Table 3-22. Teller HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alder Ck | Teller | A-3 | Mining/Let Intent | 1992 | | Federal Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gold Run | Teller | A-3 | Mining/Rec Plan | 2000 | | Federal Land | 2.0 | 0.0 | 2.0 | 0.0 | 2.0 |
| Gold Run Ck | Teller | A-3 | Suction Dredge | 2000 | | Federal Land | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 |
| Gold Run Ck | Teller | A-3 | Suction Dredge | 2001 | | Federal Land | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 |
| Gold Run Ck | Teller | A-3 | Suction Dredge | 2002 | | Federal Land | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 |
| Gold Run Ck | Teller | A-3 | Suction Dredge | 2004 | | Private Land | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 |
| Gold Run Ck | Teller | A-3 | Suction Dredge | 1991 | 1999 | Federal Land | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 |
| Gold Run Ck | Teller | A-3 | Mining/Let Intent | 1998 | | Private Land | 4.0 | 0.0 | 0.0 | 4.5 | 4.5 |
| Tuksuk Channel | Teller | A-2 | Exploration | 1990 | | State Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; Let Intent = letter of intent; dst = disturbance; Rec Plan = reclamation plan; no entry in the Last Year column means operations only lasted for 1 year.

In reality the above listings represent only two separate locations. The multiple listings for Gold Run/Alder Creek are preserved to show different operators in different years. The limited mining that actually occurred, was by small scale suction dredging of the creek bottom. The second location, Tuksuk Channel is a tidally influenced channel between Imuruk Basin and Grantly Harbor, two inland lakes. The claimant was the same as on Gold Run Creek and presumably was using his suction dredge to assess placer gold potential of areas of this channel. According to the available records from 1998 through the 2002 mining season, a total of 6.5 acres of State lands were disturbed using small scale suction dredging methods. In the 1980s there was a medium scale placer mine operating on Eagle Creek, southwest of Teller. These records are not included in the APMA database but at least three shallow mining cuts were taken out along the creek, each in excess of 600 feet in length and up to 300 feet wide. Mining was by small dozer and scraper operations feeding a sluice box set on bedrock grade. These operations ceased in the late 1980s. Small scale wash plant mining operations followed up on historic dredge and scraper mining operations of the gold rush era around the northeast end of Grantley Harbor until the early 1980s.

### 2. Nome HLMP Area

As this HLMP is so heavily impacted by mining activity, it is split into two parts: the Nome East HLMP and the Nome West HLMP.

a. Nome East HLMP

The Nome HLMP covers a vast area of the southern Seward Peninsula and has received much attention by prospectors and miners beginning with the Nome Gold Rush at the turn of the 19th

Century. An expansive system of roads and trails, supplemented in the early days by railroads, assisted the development of the largest number of mineral deposits in the planning area. There are only a couple of small, isolated tracts of unecumbered BLM lands scattered though the eastern edge (east of Council) of the Nome HLMP area. There is a large block of State-selected lands in the northwest corner of the area (the Kigluaik Mountains), but these selected lands contain only two significant known mineral occurrences. There are also large tracts of Native-selected lands: one particularly large block northeast of Nome and another block east of Solomon. The block east of Solomon contains three significant, known mineral deposits.

**Table 3-23. Nome East HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L Willow Ck | Solomon | D-6 | Mng/Expl/Let Intent | 1991 | 1995 | State Land | 5.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Eagle Ck | Solomon | D-6 | Mining | 1988 | | State Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Eagle Ck | Solomon | D-6 | Mining/Exploration | 1989 | 1990 | State Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| El Dorado Ck | Solomon | B-3 | Mining/Exploration | 1991 | | Private | 5.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Telegram Ck | Solomon | D-6 | Mining/Let Intent | 1992 | | State Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Crooked Ck | Ben | B-4 | Expl/Mining/Let Intent | 1992 | 1999 | State Land | 10.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Gold Bottom | Solomon | D-4 | Mining/Exploration | 1989 | | State Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Iron Ck | Solomon | D-6 | Mining/Exploration | 1991 | | State Land | 7.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Iron Ck | Solomon | D-6 | Mining/Exploration | 1989 | 1990 | State Land | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Goose Ck | Solomon | D-5 | Mining/Exploration | 1989 | | State Land | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sunshine Ck | Solomon | D-5 | Mining/Exploration | 1989 | | State Land | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dome Ck | Solomon | D-6 | Expl/Let Intent | 1989 | 1993 | Federal | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dome Ck | Solomon | B-6 | Expl/Let Intent | 1996 | | State Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dome Ck | Solomon | D-6 | Expl/Let Intent | 1993 | 1994 | Federal | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dome Ck | Solomon | D-6 | Mining/Exploration | 1989 | 1991 | State Land | 11.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dome Ck | Solomon | D-6 | Mining/Let Intent | 1995 | 2001 | State Land | 10.0 | 4.8 | 0.0 | 0.0 | 4.8 |
| Iron Ck | Solomon | D-6 | Mng/Expl/Let Intent | 1993 | 1996 | State Land | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| N/A (Beach) | Solomon | C-4 | Mng/Expl/Let Intent | 1993 | | Private | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Auburn Ck | Solomon | D-5 | Mng/Expl/Let Intent | 1993 | 2000 | State Land | 3.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| Daniels Ck | Solomon | C-4 | Mining/Exploration | 1991 | | Private | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Albion Ck | Ben | A-4 | Hrdrock Expl/Let Intent | 1995 | 1998 | State Land | 4.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| None | Ben | A-5 | Expl/Let Intent | 1995 | 1997 | State Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pilgrim River | Solomon | D-6 | Hardrock Exploration | 1996 | 2002 | State Land | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Crooked Ck | Ben | B-4 | Hrdrock Expl/Let Intent | 1996 | 1997 | State Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Boulder Ck | Solomon | D-5 | Mining/Exploration | 1997 | 2003 | State Land | 5.0 | 7.5 | 0.0 | 0.0 | 7.5 |
| Goose Ck | Solomon | D-5 | Mng/Expl/Let Intent | 1997 | 2000 | State Land | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Slate Ck | Solomon | D-6 | Expl/Let Intent | 1997 | 1998 | State Land | 2.0 | 0.9 | 0.0 | 0.0 | 0.9 |
| Little Willow Ck | Solomon | D-5 | Expl/Let Intent | 2000 | 2001 | State Land | 0.0 | 0.6 | 0.0 | 0.0 | 0.61 |
| Solomon River | Solomon | C-5 | Expl/Let Intent | 1998 | | State Land | 1.0 | 0.1 | 0.0 | 0.0 | 0.1 |

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lower Willow | Solomon | D-5 | Expl/Let Intent | 1998 | 1999 | State Land | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Canyon Ck | Solomon | D-5 | Suction Dredge | 2000 | 2002 | State Land | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Solomon River | Solomon | C-5 | Expl/Reclamation | 2000 | | Private Land | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Solomon River | Solomon | C-5 | Exploration | 2001 | | Private | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Sherrette Ck | Solomon | D-6 | Exploration | 2001 | 2004 | State & Private | 0.0 | 1.5 | 0.0 | 2.5 | 4.0 |
| American Ck | Solomon | D-5 | Expl/Let Intent | 1989 | 1993 | Federal Land | 16.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Norton Sound | Solomon | C-4 | Suction Dredge | 1998 | 2002 | State Land | 0.0 | 1.5 | 0.0 | 0.0 | 1.5 |
| Norton Sound | Nome | C-2 | Suction Dredge | 1997 | | State Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; dst = disturbance; Ben = Bendeleben; Expl = exploration; Mng = mining; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

In the eastern part of the Nome HLMP area, 39 mining operations are listed from 1989 to present. Three of these operations represent suction dredging of offshore mining lease holdings. The overwhelming majority of the upland operations are located on State lands with only a couple on private (patented) lands. The six mining operations listed identified as being on Federal lands occurred in the early 1990s and represent mining activities on selected lands that were subsequently conveyed out of Federal ownership. In total 126 acres in the Eastern Nome HLMP were under permit for mining from 1989 through the 2004 mining season. Alaskan mining companies operating in the East Nome area include Quaterra Alaska Inc. on Pilgrim River, Alaska Eldorado Gold Company on Dome Creek, Goldstream Exploration, LLC on Little Willow Creek and the Solomon River, and Thurman Oil and Mining on the Solomon River. Teck Cominco American, Inc., an international mining corporation, conducted hard rock exploration activities on State land in Albion Creek, Crooked Creek, and Pilgrim River.

The most active mining area during the 1990s to present is the Iron Creek/Dome Creek drainage. Eight mining operations are listed with a total of 53 acres under permit. The largest operations (10 acres or more) were located on Crooked, Dome, Iron, and American creeks. These operations averaged less than two acres of disturbance per year of operation. Owner/operators were private individuals operating as a family business except for the activity on American Creek which was done under the auspices of the Gold Prospectors Association of America (GPAA). The GPAA also operated their business on private lands on Sherette Creek. The GPAA is a quasi mining business that offers vacation packages to persons interested in gold panning and prospecting.

**Mining Activity Highlights**

- In 1992 Cook Inlet Regional Native Corporation (NPMC) conducted mineral exploration of the Big Bar prospect in Bendeleben Mountains.
- In 1995, Bering Straits Native Corporation (BSNC) and Kennecott Exploration conducted mineral exploration activities on Native lands north of Nome. These locations had been previously explored by others from 1987 through 1992.
- Cominco American staked what they interpret as a high grade mesothermal quartz-carbonate-gold occurrence on State land in the Stewart River drainage.
- In 1996 Kennecott Exploration and BSNC conducted trenching on Native land around Mt. Distin.
- Thurman Oil and Mining drilled 52 holes for placer gold on patented mining claims at Dahl Creek.
- In 1997 Intercontinental Mining conducted 6,000 feet of core drilling at the Big Hurrah Mine. Exploration continued through 1997 along Mt. Aurora and Mt. Distin trends (State and Native lands).
- Kennecott Exploration interest in BSNC's lease properties at Mt. Distin, Fred, and Steep creeks and Energizer initiated in 1996 continued through 1998. Additional hard rock property targets included Bulk Gold (23 miles north of Nome), Wild Bunch (Candle), and Think Zinc (54 miles northeast of Nome) properties.
- In 2000 exploration activity continued at Mt. Distin and vicinity.
- The year 2002 brought a drop in exploration interests in the area. Quaterra dropped their interest in the Think Zinc, Sinuk River, and Rocky Mountain Creek properties, retaining Big Bar in the Bendeleben Mountains (State or Native lands).
- In 2003 the ADGGS released maps of their geophysical surveys in Council Area. Altar Resources explored areas north of Nome and in the Council area and through a joint venture with BSNC explored mineral potential along Ophir Creek.

b. Nome West HLMP

Over a 16-year period (1989-2004) mining and mineral exploration for placer and hard rock minerals has occurred on 31 creek drainages involving a total of approximately 1,621 acres of surface disturbance within the Nome West HLMP. Hard rock exploration has occurred in at least six locations in this area involving 22.5 acres of surface disturbance primarily on private and State lands. Major mining companies involved in this work include Teck Cominco American, Consolidated Aston Resources, Ltd., Tenneco Corp, Aspen Exploration, Resource Technologies Group, Nova Natural Resources Corp, Alaska Gold Company, and Rio Fortuna Exploration Corp. By land ownership the surface disturbance acreage breaks down into 58.4 acres on State lands, 29 acres on Federal land (unpatented Federal mining claims) and 1,533.6 acres on private lands (patented mining claims and conveyed Native lands). Hard rock exploration here has expanded beyond the surface geochemical sampling and geophysical surveys. Systematic trenching, reverse circulation, and core drilling are being used to outline mineralized zones, drill geophysical targets, and collect large samples for metallurgical testing. Three of these operations have filed multiyear APMAs, one of which extends out through the 2008 mining season.

The individual miner and family owned business mining operation is present here, as in other areas but provides a background to the large operations of the Alaska Gold Company. Two medium size bucket-line dredges have been in operation annually from 1989 to 1997. Dredging near the Nome airport on Submarine Beach resulted in the disturbance of 156 acres between 1989 and 1994. A second medium size bucket-line dredge, also operated by Alaska Gold Company on Third Beach just east of Beltz, has disturbed 130 acres between 1989 and 1997. Beginning in 1992 the Alaska Gold Company began phasing out its dredging operations and switched over to more conventional open pit, drilling, and blasting operations on Center Creek along the northwest edge of Nome. By 1999, the last year of operation, approximately 303 acres of private land (patented mining claims) were disturbed and reclaimed. The other major placer gold mining operation that operated on lands under lease from the Alaska Gold Company just north of Beltz at the foot of Anvil Mountain, disturbed and reclaimed 255 acres during 1989 through 1991. This operation stripped overburden mechanically and used excavators to load 255 ton haul pack trucks to load pay into a stationary wash plant. Another operation preceded Tanner's operation, using scrapers to mechanically strip and haul pay gravels to their stationary wash plant. It had a similarly sized footprint and was located adjacent to Tanner's excavations. Since these operations occurred before 1989, they are not incluced in the APMA database.

**Table 3-24. Nome West HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mt Distin | Nome | D-1 | Expl/Let Intent | 1999 | 2000 | State/Private | 0.0 | 4.8 | 0.0 | 0.0 | 4.8 |
| Anvil Ck | Nome | C-1 | Mng/Expl/Rec Plan | 2000 | | Private Land | 4.0 | 0.0 | 0.0 | 16.5 | 16.5 |
| Anvil Ck | Nome | C-1 | Mining/Rec Plan | 2000 | | Private Land | 14.0 | 0.0 | 0.0 | 14.6 | 14.6 |
| Tripple Ck | Nome | C-1 | Mining/Rec Plan | 2000 | | Private Land | 9.0 | 0.0 | 0.0 | 28.0 | 28.0 |
| Cripple River | Nome | C-2 | Suction Dredge | 2000 | | Private Land | 3.0 | 0.0 | 0.0 | 5.1 | 5.1 |
| Divide Ck | Nome | D-1 | Expl/Let Intent | 1999 | 2001 | State Land | 1.0 | 4.0 | 0.0 | 0.0 | 4.0 |
| Osborne Ck | Nome | C-1 | Expl/Let Intent | 1999 | 2000 | Federal | 0.0 | 0.0 | 3.1 | 0.0 | 3.1 |
| Anvil Ck | Nome | C-1 | Mining/Exploration | 2001 | | Private Land | 10.00 | 11.0 | 0.0 | 12.0 | 23.0 |
| Anvil Ck | Nome | C-1 | Mng/Expl/Rec Plan | 2001 | | Private Land | 4.0 | 0.0 | 0.0 | 17.5 | 17.5 |
| Tripple Ck | Nome | C-1 | Mining/Rec Plan | 2001 | | Private Land | 6.0 | 0.0 | 0.0 | 19.0 | 19.0 |
| Divide Ck | Nome | D-1 | Expl/Let Intent | 1999 | 2001 | State Land | 1.0 | 4.0 | 0.0 | 0.0 | 4.0 |
| Cripple River | Nome | C-2 | Suction Dredge | 2001 | | Private Land | 5.0 | 0.0 | 0.0 | 18.0 | 6.0 |
| None | Nome | C-1 | Mining/Rec Plan | 2001 | 2001 | Private Land | 9.0 | 0.0 | 0.0 | 9.0 | 9.0 |
| Anvil Ck | Nome | C-1 | Mng/Expl/Rec Plan | 1999 | 2002 | Private Land | 10.0 | 1.5 | 0.0 | 20.4 | 21.9 |
| Rocky Mtn Ck | Nome | D-1 | Hardrock Exploration | 2002 | | State Land | 5.00 | 5.0 | 0.0 | 0.0 | 5.0 |
| Divide Ck | Nome | D-1 | Hardrock Exploration | 2002 | | State Land | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 |
| Dry Ck | Nome | C-1 | Mng/Expl/Rec Plan | 2002 | | Private Land | 9.0 | 11.0 | 0.0 | 16.0 | 27.0 |
| Glacier Ck | Nome | C-1 | Mining/Let Intent | 2002 | 2006 | Private Land | 11.0 | 3.0 | 0.0 | 15.8 | 18.8 |
| Anvil Ck | Nome | C-1 | Mng/Expl/Rec Plan | 2003 | | Private Land | 3.0 | 0.0 | 0.0 | 10.4 | 10.4 |
| Cripple River | Nome | C-2 | Mining/Rec Plan | 2003 | | Private Land | 1.0 | 0.0 | 0.0 | 4.5 | 4.5 |
| Divide Ck | Nome | D-1 | Hardrock Exploration | 2003 | | State Land | 0.0 | 0.5 | 0.0 | 0.0 | 0.5 |
| Snake River | Nome | C-1 | Hardrock Exploration | 1999 | 2005 | State/Private | 0.0 | 3.8 | 4.0 | 0.0 | 7.8 |
| Clara Ck | Nome | D-1 | Expl/Let Intent | 2002 | 2007 | State/Private | 17.0 | 8.0 | 0.0 | 14.3 | 22.3 |
| Cripple River | Nome | C-2 | Mining/Rec Plan | 2004 | | Private Land | 1.0 | 0.0 | 0.0 | 4.5 | 4.5 |
| Snake River | Nome | C-1 | Expl/Let Intent | 1999 | * | Private Land | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 |
| Anvil Ck | Nome | C-1 | Mining/Exploration | 1989 | 1991 | Private Land | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Submarine Beach | Nome | C-1 | Mining/Rec Plan | 1989 | 1994 | Private Land | 55.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Third Beach | Nome | C-1 | Mining/Rec Plan | 1989 | 1997 | Private Land | 130.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Little Rocker | Nome | C-1 | Mining/Let Intent | 1989 | 1992 | Federal & Private Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dry Ck | Nome | C-1 | Exploration | 1991 | | Private Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Snake River | Nome | D-1 | Expl/Let Intent | 1991 | 2000 | State/Private | 8.0 | 3.6 | 0.0 | 6.0 | 9.6 |
| Anvil Ck | Nome | C-2 | Mining/Rec Plan | 1992 | 1994 | Private Land | 18.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rock Ck | Nome | C-2 | Mining/Rec Plan | 1992 | 1993 | Private Land | 7.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| Oregon Ck | Nome | C-2 | Mng/Expl/Let Intent | 1992 | 1996 | Private Land | 12.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Center Ck | Nome | C-1 | Mining/Rec Plan | 1992 | 1997 | Private Land | 210.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dexter Ck | Nome | B-1 | Mining/Let Intent | 1992 | 1999 | Private Land | 27.0 | 0.0 | 0.0 | 8.1 | 8.1 |
| Anvil Ck | Nome | C-1 | Mng/Expl/Rec Plan | 1992 | 1999 | Private Land | 36.0 | 0.0 | 0.0 | 32.5 | 32.5 |
| Speciman Glch | Nome | C-1 | Mining | 1989 | 1990 | Private Land | 40.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Specimen Glch | Circle | C-1 | Mining/Rec Plan | 1989 | 1999 | Private Land | 85.0 | 0.0 | 0.0 | 23.0 | 23.0 |
| Clara Ck | Nome | D-1 | Exploration | 1989 | 1990 | State Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Basin Ck | Nome | C-1 | Mining/Let Intent | 1989 | 1997 | Private Land | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Buster Ck | Nome | C-1 | Mining | 1989 | 1991 | Private Land | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Daniels Ck | Solomon | C-4 | Mining/Exploration | 1991 | | Private Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Tripple Ck | Nome | C-1 | Mng/Expl/Rec Plan | 1993 | 1998 | Private Land | 65.0 | 0.0 | 0.0 | 108.0 | 108.0 |
| Hastings Ck | Nome | B-1 | Mng/Expl/Let Intent | 1990 | 1994 | Private Land | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rock Ck | Nome | C-1 | Expl/Let Intent | 1990 | 1994 | Private Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cripple River | Nome | C-2 | Suction Dredge | 1990 | 1999 | Private Land | 23.0 | 0.0 | 0.0 | 6.5 | 6.5 |
| Divide Ck | Nome | D-1 | Expl/Let Intent | 1995 | 2001 | State Land | 5.0 | 5.0 | 0.0 | 0.0 | 5.0 |
| Ashland Ck | Nome | C-2 | Expl/Let Intent | 1995 | 1998 | Private Land | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 |
| Dry Ck | Nome | C-1 | Mng/Expl/Rec Plan | 1996 | 1999 | Private Land | 66.0 | 0.0 | 0.0 | 147.0 | 147.0 |
| Sinrock River | Nome | D-2 | Expl/Let Intent | 1996 | 1997 | State Land | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Submarine Beach | Nome | C-1 | Reclamation Plan | 1996 | 1998 | Private Land | 105.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Washington Ck | Nome | C-1 | Expl/Let Intent | 1998 | 1999 | Federal | 1.0 | 0.0 | 3.3 | 0.0 | 3.3 |
| Osborne Ck | Nome | C-1 | Expl/Let Intent | 1997 | 1999 | Federal | 3.0 | 0.0 | 7.1 | 0.0 | 7.1 |
| American Ck | Nome | D-2 | Mining/Let Intent | 1997 | | State Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Center Ck | Nome | C-1 | Mining/Rec Plan | 1999 | 2001 | Private Land | 93.0 | 0.0 | 0.0 | 92.5 | 92.5 |

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; dst = disturbance; Ck = creek; Glch = gulch; Mng = mining; Expl = exploration; Rec Plan = reclamation plan; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

Between 1989 and present 57 operations were permitted within the Nome West HLMP area, accounting for approximately 1,189 acres. By far the largest operation, an open pit placer mine operated by Alaska Gold Company on their private lands on Center Creek mined 210 acres from 1992 through 1997 using drill and blast techniques. The second largest mining operation, also Alaska Gold Company, mined 130 acres of ground along Third Beach, on patented mining claims. This was accomplished by bucket-line dredge operating seasonally from 1989 through 1997. The third largest mining operation, again Alaska Gold Company mined 105 acres between 1996 and 1998 on Submarine Beach using drill and blast open pit mining methods. In addition there were nine other placer mining operations that mined between 14 and 85 acres each. These were located on Anvil Creek, Specimen Gulch, Tripple River, Dry Creek, and Cripple River. All of these large operations were on the coastal plain or river drainages flowing across the plain, and were located on private, patented mining claims.

The second largest center of activity was on Rock Creek, a tributary to the Snake River in the foothills behind the Nome Coastal Plain. Exploration and development of hard rock resources was carried out by a combination of BSNC, Addwest Minerals Inc., Tenneco Mining Corporation, and Aspen Exploration Corporation. This development is taking place largely on private (patented mining claims and Native lands) lands and some Federal claims on selected lands. At the time of this writing, the operator on this property, Nova Gold, the successor in interest to the Alaska Gold Company, plans to bring this hard rock property into production in 2006.

Continuing up the Snake River from Rock Creek on Mt. Brynltsen are the active hard rock exploration operations of Hawley Resource Group, Inc., Consolidated Aston Resources, Ltd., and Kennecott Exploration Company on Mount Distin. These lands are owned by the State and BSNC as are the lands just to the north of this location on Divide Creek which are being explored for their hard rock potential by Teck Cominco American, Inc. and Rio Fortuna Exploration Company. Quaterra Alaska, Inc. continued hard rock exploration on State lands of Rocky Mountain Creek between 1994 and 2000.

The remainder of the mining permits in this area went to individual miners mining placer gold resources on largely private lands from historic mining locations that have continued to produce for over a century of mining activity. Perhaps the most visible and typical of these operations was Steve Pomeranke's State mining operations on Tripple Creek where mining cuts were opened to aggregate 20 acres of now reclaimed surface disturbance between 1993 and 2001. The only Federal mining operations in the area are on Washington and Osborne creeks. These involved exploration and prospecting from 1997 through 2000 with a dozer and backhoe feeding a mobile test plant for purposed of mineral patenting.

Of passing interest and significant local economic importance are the numerous off shore suction dredge mining operations. Particularly since the State has set aside an area of offshore mineralized lands for recreational dredging opportunities, the few hardscrabble tents pitched on the Nome Beach east of the seawall has developed into a significant, seasonal enterprise. Some 29 operators on both offshore mining lease holdings and within the designated recreational dredging area off the East End of Nome have received permits for offshore dredging from 1997 through 2004. Now instead of the two to three camps with individuals shoveling sand into rocker boxes or sluices connected to small water pumps, its common to see three to four bright yellow suction dredges with underwater divers floating off shore on calmer days.

Exploration, development, and medium to large scale placer mining occurred throughout this geographic area mainly due to access development by the gold rush era miners. Proximity to tidewater and developed port facilities made it easy to import large scale mining equipment, trucks, and Euclid scrapers. The availability of unmined, patented mining holdings of the USSR&M Mining Company (also known as the Alaska Gold Company and now Nova Gold) and their willingness to negotiate reasonable lease mining agreements encouraged additional mining. The Alaska Gold Company operated two large scale bucket-line dredges into the early 1990s before going to year around open pit, drill, and blast operations. These mining operations ceased in the late 1990s as interest in lode gold prospects on patented holdings of the Alaska Gold Company grew. It is now expected that Nova Gold will put its Rock Creek Property in production in 2006.

Two future developments that look particularly promising are the Rock Creek deposit being developed by Nova Gold and Mt. Distin being explored by Kennecott Exploration/BSNC. These mineral properties are located on State lands and State/Native lands respectively.

**Mining Activity Highlights**

- In 1989, West Gold, in preparation for commencing offshore bucket-line dredging operations (the Bima), conducted offshore design and environmental studies. The Alaska Gold Company continued its thaw field drilling to develop reserves ahead of Dredges 5 and 6. BSNC and Kennecott Exploration conducted lode tin exploration activities at Cape Mountain, Potato Mountain, Brooks Mountain, Lost River, and Black Mountain. Exploration of the gold veins at Rock Creek and Mt. Distin was carried out.
- In 1989, exploration drilling and trenching continued in the Rock Creek and Sophie Gulch locations. Placer Dome/Golden Creek's Joint Venture conducted intensive exploration of the mesothermal gold occurrence in this area by doing additional core drilling to bring the total to 60,000 feet of core drill since 1987. In addition bulk sampling of the gold-quartz veins of Rock Creek was taken for metallurgical testing. Published results of this testing indicated a 92 percent recovery free milling with grinding/floatation. Lost River Mining conducted exploration rotary drilling for placer gold and tungsten on Anvil and Tripple creeks.
- Tenneco Inc. conducted geochemical exploration activities in 1990 putting in a soil grid at Rock Creek on State and patented mining claims. At the end of the season Tenneco withdrew from the property. The Alaska Gold Company continued its development thaw field drilling in front of its dredges on patented mining claims and continued dredging with its bucket line dredges. BHP-Utah International continued its Mt. Distin core drilling and geochemical sampling programs. BSNC began actively advertising opportunities for joint venture partners with local corporations interested in exploring for rare earth minerals and gold. The Bima offshore bucket-line dredge permanently suspended its operations at the end of the 1990 season.
- During the 1991 season Aspen Exploration ran test mining trials at the Rock Creek-Sophie Gulch property. Anvil and Windfall Mining placer mining operations on private land near Beltz (leased from Alaska Gold Co.) ceased.
- In 1992, BSNC announced that at its Mt. Distin property the gold values are thrust fault controlled gold and reduced its State holdings. It was announced that Alaska Gold Co. plans to make this the last season of bucket-line dredging and would begin year round open cut mining the next season.
- In 1993, Kennecott Exploration with BSNC and Hawley Resource Group discover a gold-polymetallic prospect they call Twin Mountain located just west of Snake River on State

land. Alaska Gold Co. dredge operation with a single dredge continues, and open cut preparation begins at the expense of no thaw field expansion.

- The geophysical maps produced in 1994 by the ADGGS airborne geophysical surveys done in 1993 spark interest in the Snake River drainage. Teck Cominco American conducts active mineral exploration on what is considered a massive sulfide deposit on Rocky Mountain Creek. On-Line Exploration conducted mapping and sampling activities of the industrial mineral, graphite, as it occurs on the Federal mining claims of N.B. Tweet and Sons Dredging occurrences. Lost River Mining and Steve Pomeranke continue trenching and sampling Tripple Creek. Alaska Gold Co. continues stripping for open cut mining. Alaska Gold Company's Dredge 6 was mothballed in 1994 and 1995 will be Dredge 5's last year of operations. Dan Walsh opened a mining cut on the bench placers of Dexter Creek and Bert Pettigrew continued mining on Anvil Creek.
- In 1995, Alaska Gold Co. used open pit mining as their sole mining method. Drilling and blasting and stripping overburden and stockpiling pay gravels that occurred over winter changes over to sluicing stockpiled pay in the summer. AGC's bucket-line dredges are mothballed. At Rock Creek drilling, trenching, and ground geophysical surveys continued. The mineral exploration activities of Kennecott Exploration and BSNC at their Aurora Creek property continued. This property is identified as a lead, zinc, barite, gold massive sulfide occurrence.
- In 1996, Alaska Gold Co. conducted a reverse circulation drilling program to develop resources for its open pit mine just outside the Nome town site. Nova Natural Resources Corp. conducts sub sea dredging operations offshore of Nome. Lost River Mining Corp. continues mining placer gold on Tripple Creek.
- In 1999, Nova Gold and Kennecott Exploration conducted a drilling program on Anvil Creek and later in the season announced that it has developed a two million ounce placer gold deposit on patented claims.
- In 2000, Nova Gold at their Rock Creek property conducted bench and pilot scale metallurgical testing. Mineral exploration activities for lode gold mineralization continued on BSNC lands in the Nome area.
- In 2002, Nova Gold announced their decision to bring Rock Creek to production within the next three years. Pre-production work by Nova Gold in 2003 consisted of 36,000 feet of infill drilling and they are proceeding with the feasibility study to bring Rock Creek into production.

## (c) Eastern Seward Peninsula Region

Older basement rocks in the area are largely covered by Cenozoic sedimentary and sub-aerially erupted volcanic rocks. Older basement rocks consist of upper Paleozoic and Mesozoic marine sediments and mafic volcanics intruded by Cretaceous intermediate to felsic intrusives. High Locatable Mineral Potential Areas within this region include: Darby Mountains and Western Alaska.

### 1. Darby Mountains HLMP Area

This HLMP area contains only small isolated tracts of unencumbered BLM land in the northwest and northeast corners of the area and a thin edge along the east central edge. No known, significant mineral deposits occur on these BLM lands. The bulk of the area, the northern Darby Mountains and eastern Bendeleben Mountains, is State-selected.

Over a 13-year period (1989 through 2001) mining and mineral exploration, principally for placer gold, occurred over a total of 22.8 acres. By land ownership this acreage breaks down into 16

acres on unpatented Federal placer mining claims on State-selected lands plus two acres of State land, and 4.8 acres of State land. The 18 acres on the Tubutulik River were mined by an individual for placer gold on mixed Federal and State claims between 1989 and 1993. The 4.8 acres of State land was prospected for hard rock minerals by Greatland Exploration. No applications have been filed in recent years.

**Table 3-25. Darby Mountains HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S.Fork Omilak | Ben | A2 | Hardrock Expl | 1997 | 2001 | State Land | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 |
| Tubutulik River | Sol | D1 | Mining/Expl/ Rec Plan | 1989 | 1993 | Federal & State Land | 13.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; Dst = disturbance; Ben = Bendeleben; Sol = Solomon; Expl = exploration; Rec Plan = reclamation plan.

Mining interest here is primarily exploration. The GPAA accounts for much of the interest with recreational mining on patented holdings around Omalik Mine (a lead-silver lode) and associated gold placer values of associated mineralization. Greatland Exploration Ltd. staked a large claim block north of the Omalik Mine for molybdenum and rare earth interests in the Darby Mountains south of Omalik which encouraged prospectors for a time.

**Mining Activity Highlights**

- In 2002 Greatland Exploration Ltd. conducts mineral exploration of the Omalik Mine property.

### 2. Western Alaska HLMP Area

The bulk of this HLMP area is patented and tentatively approved State lands with the northern and southern points conveyed Native lands. The BLM retains only a couple townships north of Koyuk and east of Haycock. No known, significant mineral deposits are located on these BLM lands.

Over a 16-year period (1989-2004) mining and mineral exploration, principally for placer gold has occurred over a total acreage of 559.5 acres. By land ownership this acreage breaks down into 119.5 acres on Federal land (unpatented Federal placer mining claims), 291.0 acres on State land and 149.0 acres on private (patented mining claims) land. Most of the mining has been done by private individuals and small family businesses. Acreage numbers represent placer gold mining and exploration as hard rock exploration applications listed no surface disturbance. Hard rock exploration for nickel, platinum and other platinum group elements (PGE) was recently conducted on the Peace River by an out-of-state consortium, Pt-PD Corporation. Hard rock exploration also was conducted by NANA Regional Corporation in conjunction with Kennecott Exploration on Virginia Creek presumably to evaluate mineral potential of Native-selected lands.

**Table 3-26. Eastern Seward Peninsula/Western Alaska HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bear Ck | Candle | C-5 | Mining/Rec Plan | 1989 | 1992 | State & Federal | 47.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Bear Ck | Candle | C-5 | Reclamation Plan | 1989 | 1998 | State & Federal | 107.0 | 7.5 | 0.0 | 0.0 | 7.5 |
| Candle Ck | Ben | D-1 | Mining/Let Intent | 1989 | 1993 | State Land | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Candle Ck | Ben | D-1 | Mining/Rec Plan | 1989 | 2003 | Federal & Private | 47.0 | 5.0 | 0.0 | 13.5 | 18.5 |
| Candle Ck | Ben | D-1 | Expl/Let Intent | 1993 | 1994 | State & Private | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Candle Ck | Candle | D-6 | Mng/Expl/Let Intent | 1989 | 2000 | Private | 38.0 | 0.0 | 0.0 | 10.2 | 10.2 |
| Candle Ck | Candle | D-6 | Expl/Let Intent | 1996 | | State Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Candle Ck | Ben | D-1 | Mining/Rec Plan | 1997 | 1999 | Private | 10.0 | 0.0 | 0.0 | 4.0 | 4.0 |
| Candle Ck | Candle | D-6 | Mining/Let Intent | 1989 | 2003 | Private | 16.0 | 0.0 | 0.0 | 4.3 | 4.3 |
| Cub Ck | Candle | C-5 | Mining/Rec Plan | 1995 | 1998 | State Land | 63.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Glacier Ck | Ben | C-1 | Mng/Expl/Let Intent | 2000 | 2001 | State Land | 4.0 | 8.0 | 0.0 | 0.0 | 8.0 |
| Glacier Ck | Ben | C-1 | Mng/Expl/Rec Plan | 1994 | 2001 | State Land | 12.0 | 4.0 | 0.0 | 0.0 | 4.0 |
| Gold Run Ck | Ben | C-1 | Mining/Rec Plan | 1993 | 2004 | State Land | 31.0 | 13.4 | 0.0 | 0.0 | 13.4 |
| Jump Ck | Ben | D-1 | Exploration | 1990 | | Federal | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Jump Ck | Ben | D-1 | Expl/Let Intent | 1993 | 1995 | State Land | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kiwalik River | Candle | D-6 | Min/Recl Plan | 1989 | 1993 | State & Federal | 54.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kugruk River | Ben | C-1 | Expl/Let Intent | 1992 | 1994 | State & Federal | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kugruk River | Ben | C-1 | Expl/Let Intent | 1994 | | State Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lime Ck | Ben | C-1 | Expl/Let Intent | 1995 | | State & Federal | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Limestone Ck | Ben | D-1 | Mng/Expl/Let Intent | 1992 | | State Land | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Mud Ck | Candle | D-6 | Mining/Let Intent | 1989 | 2004 | State Land | 20.0 | 23.5 | 0.0 | 0.0 | 23.5 |
| Peace River | Candle | A-5 | Expl/Reclamation | 2001 | 2005 | State & Federal | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Quartz Ck | Candle | B-5 | Mng/Expl/Rec Plan | 1992 | 1993 | State Land | 8.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sweepstakes Ck | Candle | B-5 | Mining | 1989 | 1990 | State Land | 14.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sweepstakes Ck | Candle | B-5 | Mining | 1989 | | State Land | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: Ck = creek; St = State; Fed = Federal; Pri = private; Dst = disturbance; Ben = Bendeleben; Mng = mining; Expl = exploration; Rec Plan = reclamation plan; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

Mining resumed on placer gold properties opened during gold rush times and were facilitated by the availability of patented mining ground. The Kugruk River south of Chicago Creek was very busy in the mid 1980s fueled by the enormous jump in the price of gold in 1980. On these State lands the regulatory environment was quite favorable and access trails and airstrips developed in the early days facilitated access to these properties from both Candle and Deering. The more-than-5,000 foot Granite Mountain airstrip constructed by the military for its White Alice Site and surplus of the earth moving construction equipment encouraged development and mining of historic mines in the area. Very recently the Haycock area, long known for its placer platinum shows along with the placer gold has attracted the interest of mining companies looking for platinum and PGE minerals.

**Mining Activity Highlights**

- In 1989, BHP-Utah International conducts geochemical exploration (soil grids) of its Kelly Creek Property. In advance of planned placer mining operations, access trails and equipment pads are put in from Candle to Mud Creek and the Kiwalik Flats.
- In 1990, the Berg/Wetelsen partnership, owners of the Independence Mine, conduct core drilling, geochemical, and geophysical surveys on the property.
- The 1991 season is the third and final year of operations of the Kiwalik Flats placer gold mining operation near Candle.
- Mining operations on the Candle Bench patented mining claims continues as does mining on Mud Creek initiated in 1989.
- In 1992, NANA Regional Corporation in partnership with Kennecott Exploration targets exploration of polymetallic mineral occurrences on its lands in the Candle area and the Imnachuk River area to the west.
- Overburden stripping and development churn drilling is conducted in the vicinity of the Independence Mine on the upper Kugruk River, on Lime Creek tributary to Candle Creek, and on patented claims on Candle Creek itself.
- The year 1992 was noted for its abnormally short mining season and disappointing production levels for mining operations on Candle and Mud creeks.
- In 1993 the Berg/Wetelsen partnership conducts rotary drilling for placer gold development at Candle.
- In 1994, Kennecott Exploration continues its hard rock exploration activities out of Candle on BSNC land.
- Hard rock mineral exploration in 1998 targets the Bulk Gold (23 miles north of Nome), Wild Bunch (Candle) and Think Zinc (54 miles northeast of Nome) properties.
- At the southern end of the HLMP Pt-Pd Exploration Co. conducted geochemical exploration with a track mounted soil auger in the Dime Creek area, continued from 2000.

### (d) Eastern Norton Sound Region

This lithotectonic terrane consists of upper Jurassic to upper Cretaceous andesitic volcanic and volcaniclastic rocks which are interpreted as representing an island arc type assemblage formed on an overriding plate of a subduction zone operating outboard of the stable North American continental margin. The Eastern Norton Sound Region includes the Shaktoolik HLMP area.

#### 1. Shaktoolik HLMP Area

BLM-managed lands here surround the upper Ungalik River corridor (State- and Native-selected). Two significant, known mineral occurrences lie along the lower Ungalik River.

From 1989 through 1993 a small, two cubic foot steel hulled stacker bucket-line dredge operated on the lower Ungalik River. These Federal mining claims are located on conveyed Native lands and were segregated from conveyance by the filing of a mineral patent application. Total surface disturbance for these 56 claims segregated by the application for the five years of APMA filings amounts to 13 acres. The dredge most likely did not even operate during these years and the same acreage was filed for each year. The dredge was not observed to have moved from its location until approximately five years ago when the Ungalik River eroded the berm of the dredge pond, flooded the pond and sank the dredge. The mining camp is located on patented placer mining claims and access is by air to a short strip leveled in the dredge tailings of the Ungalik River adjacent to the 1950s or earlier era mining camp. Of the 56 original claims in the patent application nearly half of them were lost when the applicant tried to amend the locations after the lands were withdrawn by selection of these lands by Alaska Natives. The applicant reconsidered that these staked as placer claims were actually on lode gold mineralization (a residual deposit at least). Interest in pursuing the application waned and the applicant was not able to follow through with the application.

**Table 3-27. Shaktoolik HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ungalik River | Norton Bay | C-4 | Mining/Let Intent | 1989 | 1993 | Federal Land | 13.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: St = State; Fed = Federal; Pri = private; dst = disturbance; Let Intent = letter of intent.

Small scale bucket-line dredge mining on the lower Ungalik River ceased in the late 1970s due to aging of the dredgemaster and declining interest of individuals of the family business though patented upland properties contain encouraging residual lode gold values.

**Mining Activity Highlights**

- In 1991, the Bliss bucket-line dredge was reported as not operational, its last operations being in 1987 or 1988.

### (e) Upper Kobuk River Region

As subduction continued outboard of the stable North American continental margin basalt, gabbro, and oceanic sediments (Angayucham) were thrust on the Koyukuk-Yukon Terrane. This mid-Cretaceous collisional event eventually closed the intervening sea between the Arctic Alaska and Koyukuk Yukon Terranes metamorphosing these basalts, gabbros, and oceanic sediments to greenstone facies and elevating them to the highest structural unit of the Brooks Range.

Mississippian age ophiolites are comprised of mafic to ultra-mafic assemblages of pillow basalt, chert, diabase, and gabbro locally interbedded with clastic marine sediments.

Relatively unmetamorphosed Paleozoic marine sediments are exposed in the near surface along a thrust fault which delineates the northern front of the Brooks Range and extends to the Chuckchi Sea just north of Kivilina. The Upper Kobuk River Region includes the Ambler high locatable mineral potential areas.

### 1. Ambler HLMP Area

Over a 16 year period (1989 through 2004) mining and mineral exploration, principally for placer nephrite jade, occurred over a total of 12 acres. This acreage breaks down into 10.3 acres on Federal land (Federal mining claims on Native-selected lands), one acre on State lands and 0.3 acres on private lands. The 10 acres of mining/exploration which occurred in 1989 under an application filed for NANA Regional Corporation on Dahl and Promise creeks was for the purpose of evaluating the nephrite jade potential of Federal mining claims under mineral patent application of Stewarts Jade Company. The Federal claims under this patent application were subsequently sold to NANA Regional Corporation and reverted to private Native land. The remaining 2 acres of disturbance: 1.0 Federal, 0.7 State, and 0.3 private (Native) resulted from exploration for hard rock mineral potential in the Ambler River drainage uplands by Kennecott Exploration.

**Table 3-28. Ambler HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | TOT Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ambler R | Ambler R | A1 | Expl/Let Intent | 1998 | 2003 | State Land | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Dahl Ck | Shungnak | D2 | Mining | 1989 | 1990 | Federal Land | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Promise Ck | Ambler R | A3 | Mining/Expl | 1990 | | Federal Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sub Arctic Ck | Ambler R | A1 | Exploration | 2004 | | State/Fed/ Private Land | 1.0 | 0.0 | 0.7 | 0.3 | 1.0 |

Abbreviations: St = State; Fed = Federal; Pri = private; Dst = disturbance; R = River; Ck = creek; Expl = exploration; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

Placer gold was mined from the streams of the Cosmos Hills though the main interest of the small mineral was in the nephrite jade boulders to be found in the alluvial deposits of these same streams. Kennecott Exploration's development of the Bornite property which was subsequently patented was stunted by catastrophic shaft flooding by artesian waters. Once this technical problem was solved, the economics and interests of Kennecott Exploration had changed. The surrounding lands changed to Native ownership. The new landowner has bought out surface and underground interests in the property and is presumably holding them for future development into an economic base for its Alaska Native population. Lack of access either to tidewater (which is difficult geography to negotiate) or to the haul road (stymied by land ownership patterns and political interests) is a major disincentive.

**Mining Activity Highlights**

- During the 1989 season Stewarts Jade Company carried out an exploration program to evaluate the placer gold potential in the Dahl/Promise creeks area. NANA Regional Corporation, which owns the Empire Jade Mine at Jade Mountain, acquired Stewart Jade holdings at Dahl and Promise creeks.
- In 1990, Teck Cominco American conducted core drilling at the Smucker and Sun properties located in the Baird Mountains north of Bornite.
- In 1991, mineral exploration companies concentrated their efforts in the Ambler Mineral Belt and in historic placer mining areas there as well as the Noatak lead-zinc province southwest of the Red Dog Mine. NANA Regional Corporation is active in lead/zinc/silver/gold exploration in the Ambler District as well as the Candle-Imnachuk River district to the southwest. Mineral exploration in the Ambler Mineral Belt caused renewed interest in the Bornite deposit and the volcanogenic massive sulfides occurrences Arctic, Sun, and Smucker north of the Cosmos Hills as well as the Omar-Frost VMS occurrence north of Kiana.
- Geophysical surveys are conducted in 1995 by Kennecott Exploration across the Ambler Copper belt and at Bornite in particular.
- In 1996, Kennecott Exploration continued its geophysical survey work of the Ambler copper belt and also the Candle area with airborne geophysical surveys.
- In 1997, Kennecott Exploration with NANA Regional Corporation completed 5,000 feet of core drilling at Bornite. Kennecott Exploration continued its exploration work for NANA Regional Corporation in the Ambler copper belt. This work is continued for the 1998 mining season focusing on Bornite and the Arctic deposit as well as in the Red Dog Mine area to the northwest.

## (f) Kallarchuk Hills Region

The Kallarchuk Hills, part of the Baird Mountains physiographic terrane, are composed of Paleozoic schist, quartzite, and limestone in an anticlinorial structure. The Kallarchuk Hills Region includes one high locatable mineral potential area, Omar-Kiana.

### 1. Omar-Kiana HLMP Area

Much of the lands within the area are State-selected and BLM retains lands along the Omar River, a tributary of the Squirrel River. There are no known, significant mineral deposits on BLM land. Significant mineral deposits are mapped along Klery Creek, the next tributary to the Squirrel River east of the Omar.

Though not listed in the APMA database, placer mining on Kleary Creek did occur in the late 1980s at the confluence of Jack Creek and at a location between Jack and Rocky creeks. Surface disturbance related to these mining activities totaled nearly 17 acres. A third area of placer mining occurred on Weise Creek, a tributary to Timber Creek and just over the drainage divide from the headwaters of Klery Creek.

**Table 3-29. Omar-Kiana HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wiese Creek | Baird Mtns | B-3 | Mining Exploration/Let Intent | 1989 | 1997 | Federal Land | 7.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: St = State; Fed = Federal; Pri = private; Let Intent = letter of intent.

Placer gold occurrences in this area, characterized by the developed mining activities on Klery Creek are characterized as elemental gold and PGE alloys in grains and rarely nuggets found in Cenozoic alluvial deposits. The gold is thought to have been formed during hydrothermal activity in the quartz veins in the country rock and subsequently liberated by weathering and erosion, concentrated during transport, and trapped in fractured bedrock, which formed natural riffles. These placer gold occurrences are generally restricted the schist bedrock which underlies the eastern edge of the area. West of Klery Creek which flows along the boundary of the schist the bedrock changes to limestone. The Omar-Frost prospect and copper occurrences of the medium potential LMP area which are scattered around the Squirrel River drainage divide occur. Massive base metal sulfides and arsenic sulfosalts occur in the limestone/dolomite host rocks as massive replacements, breccia fillings, or stockworks. Diagenetic pyrite or another source of sulfur precipitates the base metals in areas of high porosity and fluid flow. This method of ore emplacement is similar to the method of formation of the Bornite deposit at Ruby Creek in the Cosmos Hills.

This HLMP area, as well as a portion of the MLMP area to the northwest, are within BLM public domain lands that are currently closed to mineral entry and location.

Small scale placer wash plant operations occurred here in the mid to late 1980s. In the early 1900s a small bucket-line dredge mined areas of Klery Creek of which these recent miners took advantage. Lessee/owner relations caused the demise of these operations and the increasingly complex regulatory environment as well as conflicting local and national land use interests have discouraged continued mining efforts of late.

**Mining Activity Highlights**

- Beginning in the 1992 mining season stripping and mining on Weiss Creek by Timber Creek Mining Company was accomplished.
- In 1993 and 1994, Ambler Mineral Belt hard rock exploration activities spilled over onto the Omar and Frost volcanogenic massive sulfide occurrences.
- During the 1995 mining season Amigaq Copper Mine Inc. conducted mineral exploration activities in the Squirrel River drainage.

## (g) De Long Mountains Western Brooks Range Region

Some of the oldest rocks (Proterozoic to middle Paleozoic) in the planning area this limestone and shale unit is thought to represent continental shelf and marine slope sediments originally deposited along the passive margin of North America. These rocks are similar in composition and age and are thought to have been deposited as a single belt including the Seward and York lithotectonic terranes.

Crystalline basement rocks along the southern flank of the Brooks Range and Baird Mountains comprise a structurally complex thrust and fold package of blueschist facies metamorphosed marine shelf sediments. The De Long Mountains-Western Brooks Range Region includes both the Red Dog high locatable mineral potential area and the Red Dog medium locatable mineral potential area.

### 1. Red Dog HLMP Area

BLM-managed lands in this area are scattered, square-mile parcels in the northeastern part. The significant and producing Red Dog Mine is located on State patented and private (Native corporation) lands.

For the 10-year period between 1995 and 2004 two hard rock exploration operations have been active. Teck Cominco American has been conducting deep core drilling on its properties in the Ikalukrok Creek drainage just north of Red Dog and its helicopter transported drill rigs have disturbed a total of 4.3 acres: 2.5 on State lands, 0.5 on Federal lands (unpatented Federal mining claims on State-selected lands) and 1.3 acres of private land (conveyed Native lands). Mining claims in this area consisted of a core of less than a dozen Federal claims surrounded by State claims. The claimants converted these Federal holdings to State claims in 2001 once core drilling indicated that significant Red Dog style mineralization underlay the area. Some 24 miles west of Red Dog a second significant mineralized area underlies Federal mining claims of GCO Minerals, Teck Cominco, and Kennecott Mining companies.

Surface disturbance and footprint acreages for mines such as Red Dog are not available in the APMA database as these large mines are permitted individually by the ADNR, Division of Mines. As of 2004 the Red Dog Mine reports approximately 1,800 impacted acres. Within that total the pit is currently at 220 acres, tailings impoundment at 540 acres, waste dump at 300 acres, mill and other facilities at 45 acres, and subore stockpile at 11 acres. Over the life of the mine, the pit alone is expected to expand three times its present size. This does not include the haul road or the port facility, both of which are State owned. In the late 1980s GCO Minerals developed a 5,000 foot gravel runway on State-selected lands in the uplands adjacent to the Wulik River and established a 28 acre permanent drill camp and drill core repository, the footprint of which includes the mineralized deposit outcrop. Operations ceased at this camp before 1989 but it has been maintained as a base of operations for mineral exploration on these claims and on surrounding lands by the mining companies mentioned above.

**Table 3-30. Red Dog HLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ikalukrok Ck | De Long Mtns | D-2 | Expl/Let Intent | 2000 | 2003 | State/Fed/ Private Land | 0.0 | 1.0 | 0.0 | 0.0 | 1.0 |
| Ikalukrok Ck | De Long Mtns | D-2 | Expl/Let Intent | 2001 | 2005 | State/Fed/ Private Land | 0.0 | 0.5 | 0.5 | 0.0 | 1.0 |
| Ikalukrok Ck | De Long Mtns | D-2 | Expl/Let Intent | 2003 | 2005 | State/Fed/ Private Land | 0.0 | 0.0 | 0.0 | 0.8 | 0.8 |
| Ikalukrok Ck | De Long Mtns | D-2 | Expl/Let Intent | 2004 | 2005 | State/Fed/ Private Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ikalukrok Ck | De Long Mtns | A-2 | Expl/Let Intent | 1995 | 2003 | State/Fed/ Private Land | 1.0 | 1.0 | 0.5 | 0.5 | 2.0 |
| Wulik River | De Long Mtns | A-2 | Exploration | 2001 | | Federal Land | 0.0 | 0.0 | 0.2 | 0.0 | 0.2 |
| Wulik River | De Long Mtns | A-2 | Hardrock Exploration | 2002 | | Federal Land | 4.0 | 0.0 | 1.0 | 0.0 | 1.0 |
| Wulik River | De Long Mtns | A-2 | Hardrock Exploration | 2003 | | Federal Land | 1.0 | 0.0 | 13.0 | 0.0 | 13.0 |
| Wulik River | De Long Mtns | A-2 | Hardrock Exploration | 2004 | | Federal Land | 3.0 | 0.0 | 13.0 | 0.0 | 13.0 |

Abbreviations: St = State; Fed = Federal; Pri = private; Dst = disturbance; Ck = creek; Expl = exploration; Let Intent = letter of intent; no entry in the Last Year column means operations only lasted for 1 year.

Development of this area was the direct result of the conveyance of lands (and mineral deposits) to the NANA Native Corporation that wanted the development to provide a solid economic base for the regions' Alaska Native population. The producing mine with developed access to tidewater and port construction facilitated by the State has encouraged exploration and development of satellite mineral deposits on surrounding State lands. Marginal operations for many years were hedged by futures commodity prices and for the past several years increased production capacity of the mill along with increases in commodities prices expand reserves, encouraged development of recently located satellite deposits.

**Mining Activity Highlights**

- In 1989, Teck Cominco conducted limited drilling at Red Dog.
- NANA conducted reconnaissance geological mapping and sampling of ANCSA lands in the western Brooks Range.
- In November of 1989 Red Dog transitions to production.
- In 1990, Cominco American, the operator of the Red Dog Mine conducts core drilling at Red Dog and in discussion with GCO Minerals, Cominco positions itself as a partner in the LIK property 25 miles west of Red Dog Mine.
- During 1994 NANA-Teck Cominco mineral exploration crews conduct hard rock exploration in the Brooks Range.
- During 1995 Teck Cominco discovered a second ore body on private lands at Red Dog, the Aqqaluk deposit. They also completed a major mill upgrade adding production capacity.
- Development drilling by Teck Cominco in 1996 focused on the Aqqaluk deposit at Red Dog.
- In 1998, mineral exploration continued at Red Dog and the immediately surrounding area.
- In 1999, Teck Cominco announced a new zinc-lead-silver deposit (Anarraaq) located six miles north of the Red Dog Mine on State lands.
- In 2000, Teck Cominco conducted gravity surveys around the Red Dog Mine.
- In 2001, Teck Cominco announced drilling results for the Anarraaq deposit.
- In this same year Kennecott Exploration conducted regional mineral exploration in the Wulik River drainage on Arctic Slope Regional Native Corporation-selected land.
- In 2002, Kennecott Exploration conducted core drilling at the LIK deposit.

### 2. Red Dog MLMP Area

While this location falls outside the high locatable minerals potential area it does represent significant exploration activity in the medium potential area surrounding the Red Dog HLMP. The APMA database lists hard rock exploration activities on Tutuk Creek by Teck Cominco American from 1996 through 1998 and no surface disturbance. Helicopter exploration has identified significant mineral potential here but lack of access and isolated, remote location discourage an increase in the level of work.

**Table 3-31. Red Dog MLMP Surface Disturbance Summary**

| Drainage | Quad | Map | Activity | First Year | Last Year | Land Status | Total Acre | ST DST | FED DST | PRI DST | TOT DST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| N/A | Noatak | D-3 | Expl/Let Intent | 1996 | 1998 | State Land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Abbreviations: St = State; Fed = Federal; Pri = private; Dst = disturbance; Expl = exploration; Let Intent = letter of intent

### Mining Activity Highlights

- During the 2000 season Quaterra Resources Inc./NANA conducted mineral exploration of the mafic/ultramafic rocks around Asik Mountain looking at the PGM occurrence there.

INSERT 11x17 MAP
**3_29_minerals_locate**

INSERT 11x17 MAP
**3_30_minerals_apma**

# c) Mineral Materials

## *(1) Mineral Materials Program*

Congress set aside minerals that cannot be reserved by a mining claim, but can be purchased from the government on a per ton or per cubic yard basis. These are known as mineral materials or common variety minerals, and include such things as sand, building stone, gravel, rip-rap, shot rock, pumice, cinders, and clay.

The BLM's policy is to make mineral materials available to the public and local governmental agencies whenever possible and environmentally acceptable. Mineral material is sold to the public at fair market value, but is given free to States, counties, or other government entities for public projects. Mineral materails on Federal mining claims located prior to 1955 are not avvailable for sale by the Federal Government (Public Law 167). On lands selected by the State or a regional Native corporation, mineral material sales contracts or free use permits cannot be issued without concurrence of the State or Native entity (Instruction Memorandum AK-76-237, dated Nov. 9, 1976). Similarly for sales on un-certificated Native allotments regardless of underlying land ownership the process required concurrence. This represents a recent departure from regulation 43 CFR 3601.12(b) based on a interpretation that the trust land exception to the general FLPMA definition of public lands does not apply to lands subject to an unapproved allotment application (solicitors opinion, Hopewell, 5/16/2001). Monies collected from these sales are placed into escrow for the benefit of the future land owner. Certificated allotments are the jurisdiction of the Bureau of Indian Affairs and until recently involved the BLM in a technical advisor role by MOU dated March 17, 1985. Materials obtained free of charge cannot be bartered or sold. Before they are opened, all sites must have an approved Plan of Operation, a Reclamation Plan, and environmental analysis. Small sales of mineral materials (less than 50,000 cubic yards and under five acres of surface disturbance) are categorically excluded from the NEPA process. Except for State or municipal entities a performance/reclamation bond is required.

## *(2) Mineral Material Sales 1980 to Present*

Between 1980 and 2004 the BLM serialized a total of 32 mineral materials actions within the planning area. This includes one competitive material sale, one material site right of way grant, 19 negotiated material sales, four free use permits, and seven unauthorized use actions. Material sales generally were handled as cash sales and the length of the contract was two to three years. These sales particularly were located close to villages in the planning area. The purpose of the sale was usually to construct/improve village airstrips. In the mid 1980s ADOT was actively upgrading village airstrips to 4,000 feet and crosswind runways, where needed, and installing gravel aprons and shelter facility for waiting passengers and itinerant pilots. A second round of these types of improvements also occurred in the mid-1990s, but by then mineral materials were obtained from conveyed Native lands surrounding the village. Secondarily these materials were and are used for house pad construction, village roads (to airstrip or landfill) or dikes, and groynes for flood control.

**Table 3-32. Serialized Mineral Material Actions in the Planning Area 1980-2004**

| Case File No. | | Production (cyd) | Value ($) | | Royalty ($) | | Type | Permit Issued | Location |
|---|---|---|---|---|---|---|---|---|---|
| FF0 | 85617 | 1,000 | $500.00 | | $0.50 | | MS | 1980 | KIC, Kotzebue |
| FF0 | 71302 | 100,000 | $50,000.00 | * | $0.50 | * | MS/RW | 1981 | Crete Ck, Teller Hwy |
| FF0 | 72991 | 390 | $195.00 | | $0.50 | * | MS | 1981 | Ambler |
| FF0 | 72992 | 57,180 | $28,590.10 | | $0.50 | * | MS | 1981 | Shaktoolik |
| FF0 | 72995 | 70,000 | $18,630.90 | | $0.27 | | MS | 1981 | Dahl Ck |
| FF0 | 73173 | 60,283 | $40,300.00 | | $0.67 | | MS | 1981 | Deering |
| FF0 | 72994 | 45,038 | $22,519.10 | | $0.50 | * | MS | 1982 | Shungnak |
| FF0 | 78718 | 11,500 | $5,750.00 | | $0.50 | * | MS | 1982 | Noatak |
| FF0 | 80102 | 20,000 | $10,000.00 | * | $0.50 | * | FUP | 1982 | Shungnak |
| FF0 | 81049 | 20,000 | $10,000.00 | * | $0.50 | * | FUP | 1982 | Kiana |
| FF0 | 81224 | 16,250 | $8,125.00 | | $0.50 | * | MS | 1982 | Red Dog Mine |
| FF0 | 81245 | 0 | $0.00 | | $0.50 | * | UU | 1982 | Kotzebue NANA |
| FF0 | 79122 | 640 | $320.00 | | $0.50 | * | UU | 1983 | Kotzebue KIC |
| FF0 | 79140 | 13,724 | $6,862.50 | | $0.50 | * | UU | 1983 | Hastings Ck Green Const |
| FF0 | 81315 | 59,576 | $29,787.86 | | $0.50 | * | MS | 1983 | Crete Ck, Teller Hwy |
| FF0 | 81316 | 101,151 | $50,575.33 | | $0.50 | * | MS | 1983 | Tisuk R, Teller Hwy |
| FF0 | 81317 | 13,800 | $6,900.00 | | $0.50 | * | UU | 1983 | Nome |
| FF0 | 81442 | 700 | $350.00 | | $0.50 | * | MS | 1983 | Shungnak |
| FF0 | 81473 | 31,500 | $15,750.00 | | $0.50 | * | MS | 1983 | Kobuk |
| FF0 | 81494 | 60,000 | $30,000.00 | * | $0.50 | * | FUP | 1983 | Fox Ck, Pilgrim Springs |
| FF0 | 81682 | 182 | $910.00 | | $0.50 | * | MS | 1983 | Kotzebue |
| FF0 | 83354 | 900 | $450.00 | | $0.50 | * | UU | 1984 | Koyuk |
| FF0 | 83938 | 15,776 | $7,887.75 | | $0.50 | * | MS | 1984 | Dahl Ck |
| FF0 | 86869 | 375,119 | $243,827.30 | | $0.65 | | MS | 1990 | Red Dog Mine |
| FF0 | 88233 | 45,000 | $0.00 | | $0.50 | * | FUP | 1992 | Rocky Mtn Ck, Kougarok Hwy |
| FF0 | 88522 | 126,154 | $82,000.00 | | $0.50 | * | MS | 1993 | Red Dog Mine |
| FF0 | 91373 | 1,439 | $1,069.25 | | $0.50 | | MS | 1995 | 53.8 Kougarok Rd |
| FF0 | 91480 | 72,231 | $46,950.00 | | $0.50 | * | MS | 1996 | Red Dog Mine |
| FF0 | 91826 | 145 | $72.50 | | $0.50 | * | UU | 1996 | Grand Central Bridge |
| FF0 | 91983 | 0 | $0.00 | | $0.50 | * | UU | 1996 | Feather R, Teller Hwy |
| FF0 | 93270 | 11,155 | $15,059.25 | | $1.30 | | MS | 2001 | Shaktoolik |
| FF0 | 94203 | 2,220 | $5,550.00 | | $2.50 | | MS | 2004 | Wesley Ck, Teller Hwy |

* Estimate (case file destroyed)
Abbreviations: FUP = Free Use Permit; MS = Material Sale; MS/RW = Material Site/Right-of-Way; UU = Unauthorized Use; Ck = Creek; Hwy = Highway; Rd = Road; R = River

During this same time period the Bureau of Indian Affairs (BIA) was also actively working with certificated Native allotment owners to sell mineral materials from their allotments, particularly in the Kotzebue area. The BLM was only peripherally involved in these sales since by agreement the BLM is only responsible to review mining plans, estimate royalty payments and bond amounts, and provide contract conditions and stipulations for sales proposed on certificated Native allotments. The BIA through its contractors issued the sales contract and tracked production. This Memorandum of Agreement lost its applicability in the late 1990s and the BIA took over its own administration of these contracts. Since the early 1990s materials sales dropped off principally due to the conveyance of Native lands surrounding the villages. From there only occasional sales occur on un-certificated Native allotments, the proceeds from which go into escrow for the Native allottee, or occur as unauthorized use actions initiated by ADOT for Nome road maintenance in areas where current land status is complex. Since BLM policy does not permit the trespassing of governmental entities, these unauthorized use activities are converted to material sales after the fact.

Small scale construction projects that consume mineral materials are typically located in or immediately adjacent to a village, which is generally the location of the need. Under ANCSA these lands are dedicated to the Native corporations. By the mid-1980s the conveyance process of these village lands was largely completed. Sales generated in the early 1980s were handled under interim management policies of the BLM. Once the lands were conveyed or tentatively approved, the disposition of mineral materials became the jurisdiction of the Native corporation or State.

On State-selected lands, particularly in the Nome area which has a rather extensive road network for a community of its size with a continuing need for highway maintenance needs, mineral material needs were largely satisfied by issuing material site rights-of-way which were administered by the State and title granted to the State upon conveyance.

### *(3) Major Construction Projects Developing Infrastructure*

Nome is the primary commercial hub for the region due to its developed marine terminal and extensive airport facilities. Kotzebue is secondary to Nome only due to limitations imposed by its shallow marine environment which limits shipping. Like Nome in the early 1980s Kotzebue and other tidewater villages has to lighter container shipments from oceangoing barges which stand offshore to shallow draft barges for delivery to dry land. Nome's construction of a jetty out into Norton Sound and active dredging of its port facilities starting in the early 1980s allows docking of ocean going ships and barges and direct off loading of containers to truck tractors for delivery to warehouse and shipping customers. Construction of this jetty required large quantities of rip-rap and gravel which were conveniently at hand.

The first major construction project in the region, the Nome seawall was completed in 1951. That was followed by upgrade of the unimproved gravel roads from Nome to Teller, to Council and to the Kougarok Mining District completed in the mid-1970s. The 1980s ushered in an era of large scale infrastructure development throughout the region which continues today. What follows is a brief listing of projects undertaken since 1980 which require large amounts of mineral materials (rip-rap, sand and gravel, sand, shot rock, and their screened by-products):

- Nome Seawall - construction completed 1951 requires annual maintenance dredging
- Nome jetty - construction, periodic maintenance, and upgrades
- Bima dredge dock
- Nome water and sewer upgrade - required maintenance

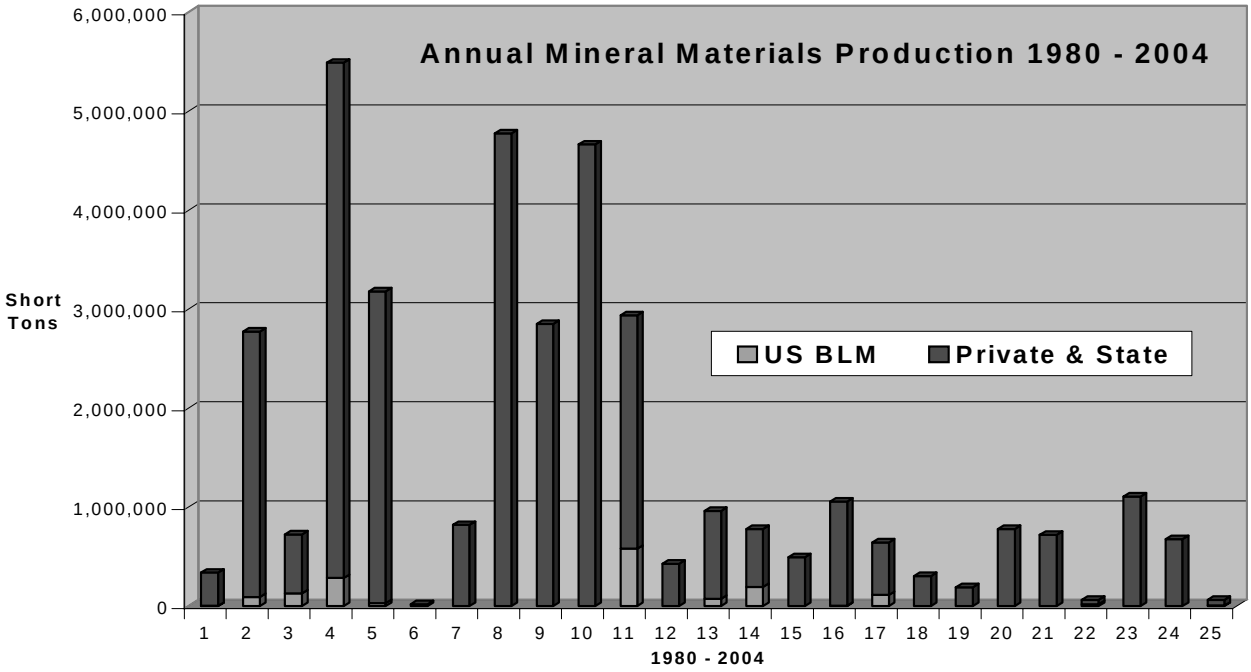
- Nome small boat harbor and port - bid award 1999 construction nearly complete
- Airport improvement and expansion projects in the villages
- Nome airport runway extension and repaving work
- Nome mail handling facility
- Nome power plant relocation
- Kotzebue airport apron expansion
- Kotzebue Regional Health Center (Maniilaq Health Center)
- Housing complexes for hospital personnel and teachers in Kotzebue.
- Red Dog Port facility and haul road
- Red Dog Mine facilities
- Nome-Council road upgrade
- Nome-Kougarok road upgrade
- Four mile road connects between reservoir and military site, Kotzebue.
- DOT road construction Teller Highway to Rock Creek Mine
- Erosion and flood control - Shishmaref, Kivilina and others

### *(4) Continuing Need for Mineral Materials for Construction Activities*

While the BLM's role in providing mineral materials for construction projects in the planning area has dwindled due to loss of ownership of resources proximate to developing areas, the need for these materials has continued to grow. In the Nome area alone nearly 300 miles of unpaved highway has been constructed mostly to interstate standards and needs to be maintained. In the late 1980s lengthening of the Nome seawall to protect against flooding, the construction of the causeway for dockside off loading of groceries, supplies and equipment destined for regional customers, airport construction and improvement in Nome and villages throughout the area, Nome small boat harbor construction, wetland filling and gravel pad construction for Kotzebue regional hospital facilities, tailings dam construction at the Red Dog Mine, the Red Dog Port facility construction, and 52 mile haul road construction and maintenance are a few major projects to date. For the years 1987 through 1990 regional sand and gravel needs ranged between 4.8 and 2.8 million tons annually ($19 million and $9.4 million, respectively). In 1995 and again in 2002 mineral materials private sales again exceeded 1 million tons. The lowest year was in 2002 when only 188,000 tons were produced.

Annual production data for the region is taken from tabulated data collected by the ADGGS and published in their Annual Alaska's Mineral Industry Special Reports. Data is solicited by voluntary questionnaire and summarized by regions as determined by the ADGGS. Of these regions of Alaska the planning area encompasses the western part of the Northern Region and the western part of the Western Region. In ADGGS's Northern Region the bulk of the mineral material reported comes from developments in the North Slope oil fields and along the Dalton Highway. The Western Region encompasses activities in the interior such as large scale mining activities at McGrath and Illinois Creek. Consequently in some instances it is difficult to separate production form these areas outside the planning area based on the narrative in the Alaska’s Mineral Industry Special Report. The following graph is the result of this effort to compare BLM's contribution of mineral material resources against State and private sources.

**Figure 3-7. Annual Mineral Materials Production 1980-2004**




Principal sources satisfying these needs are found on Native, State, and private lands. The Bering Straits Native Corporation in partnership with private enterprise operates a world class rip-rap quarry at Cape Nome and export to other tidewater villages along Alaska's western coast as well as other Pacific Rim countries. NovaGold in Nome sells tailings locally off mined patented mining claims on the Nome coastal plain and are currently studying the feasibility of shipping mineral material resources by barge to Seattle and San Francisco areas. Construction and maintenance projects associated with the Red Dog Mine are supplied by State and Native mineral material sources. Point Hope and Kotzebue are the only locations without a large, developed mineral material resource. Kotzebue, situated on the gravel spit of the tip of the Baldwin Peninsula continues to scrape gravels from their backyard to place in their front yard despite the untapped potential resources along the shoreline and bluffs of Selawik Lake.

Native and commercial construction companies have developed to fill the need for construction materials proximate to project locations. Mineral material sources are developed on Native and State lands as the conveniently accessible lands are under their ownership. The BLM retains only a dwindling role as an interim manager. Principal mineral material suppliers in the planning area include:

- NANA Regional Corporation and KIC in the Kotzebue Region
- State of Alaska, numerous locations onshore and offshore suction dredging
- NovaGold (Alaska Gold Company) Nome area
- Martinson Gravel and Crane, Nome
- Bering Straits Regional Corporation and Sitnasauk Village Corporation Nome and vicinity
- Cape Nome Products (Knik Construction and Sound Quarry, Inc.) at Cape Nome Quarry
- Drake Construction, Nimiuk point source, Kotzebue area projects
- UIC Construction, Barrow - projects in Kotzebue

### *(5) Commodity Value and Market Share*

By tonnage produced between 1980 and 1994 approximately 4 percent of the mineral materials came from BLM administered sales. Private and State sales over that same time period accounted for 96 percent of the market. While sales contracts issued by BLM are generally for two to three years if all production (and value) are entered in the year for which the permit was issued or trespass resolved our biggest year was 1993 where we sold $274,215 worth of mineral materials followed by 1990 when $243,827 was collected. Over the 25 year period revenues average just over $34,000 per year on the average. It should be also noted that the revenues received from these BLM actions were all placed into escrow accounts to the Native entity or State as these action occurred on selected lands under interim BLM management.

In contrast mineral material sales from private and State lands in the planning area average just over $5 million per year. The big year for these sales was in 1987 where mineral materials value exceeded $19.7 million. In 1983 and 1984 sales exceeded $11.7 million and in 1988 and 1990 sales exceeded $9.4 million.

# *4. Recreation Management*

## a) General Recreation

The recreational program within the Kobuk-Seward Peninsula planning area provides for remote outdoor experiences in a largely primitive environment. Only one public campground (Salmon Lake) exists within the planning area. The recreational program is responsible for management of the public's recreational use and enjoyment of BLM administered lands. Due to the remoteness, and harsh Arctic/subarctic conditions within the planning area, public use has been limited. Infrastructure within communities, particularly access, has also been a limiting factor in realizing recreational opportunities. Several areas within the planning area may benefit from an increased level of BLM management. These areas have either conflicts between recreational users or offer unique recreational opportunities.

The major recreation activities in the planning area includes hunting, fishing, trapping, gathering of edible plants and berries, hiking and backpacking, photography, camping and picnicking, wildlife viewing (predominantly bird watching), river rafting, boating, and driving OHVs (primarily snowmobiles). Although the majority of visitors to the planning area are Alaskan residents who live adjacent to BLM managed lands, an increasing number are from out of state and abroad. These visitors are drawn to the area for its recreational opportunities in an Alaskan wilderness setting. The majority of visitor use, particularly from out of state and abroad visitors, occurs during the early summer and fall months from May through the end of September. Two major sporting events, the Iditarod Dog Sled and the Tesoro Iron Dog Snowmobile races, draw the majority of visitors to the planning area during the spring.

The western Seward Peninsula offers high quality bird watching opportunities including rare western Alaska species, Asian accidentals, and representative northern Alaska bird species. A tourism report by ADOT (ADOT&PF 2004) for the Nome Area indicates that 25 percent of visitors coming to Alaska are interested in birding. Nome has become increasingly well known as a birding destination in the last 15 years and many of these visitors take advantage of the Nome area road system through independent tours. Total numbers of birders visiting the Nome area is uncertain. The Nome Convention and Visitors Bureau documented 228 birders on package tours in 2002. It has been estimated that 500-1,000 birders may visit Nome annually (ADOT&PF 2003).

The planning area has the only recognized National Historic Trail in Alaska, the Iditarod, which crosses the southern portion of the planning area between Unalakleet and Nome (Map 3-32). The Iditarod is used for casual recreational use, inter-village travel, and a variety of commercial events and group activities. One Wild and Scenic River, the Unalakleet River, abuts the planning area to the south. Some visitors are drawn to this river from within the planning area, particularly from Nome to take advantage of its tremendous fishing opportunities. There are commercial fishing guides working the river that offer world class recreational experiences. An environmental impact statement and suitability study was conducted by the BLM on the Squirrel River for inclusion into the National Wild and Scenic River System. The final report was submitted to Congress in December of 2004. The BLM recommended against a wild and scenic designation.

Public services provided by the BLM for recreation have been limited. Services have consisted of: maintenance of the Salmon Lake Campground (trash and waste disposal); the marking and

maintenance of the Iditarod Trail largely by the efforts of the Iditarod Trail Blazers; the marking of some of the designated public easements reserved through private Native owned lands via section 17(b) of ANCSA; and the creation of three recreational brochures (Squirrel River, Kigluaik Mountains, and Iditarod National Historic Trail). Brochures and public informational resources (land status and permit assistance) are available at two remote, single staffed field stations, one located in Nome and one in Kotzebue.

A number of shelter cabins exist through 2920 land use authorizations. Some unauthorized structures also exist on BLM-managed lands. Two structures, one at Wagon Wheel and one at the Squirrel River, are used as public shelter cabins. Unauthorized structures on BLM-managed lands are dealt with on a case-by-case basis.

Annual dispersed visitor use for the planning area is estimated at 2,000 visitor user days for fiscal years 2003 and 2004 (BLM 2005k). Dispersed recreational opportunities exist throughout the planning area. Budget constraints and uncertainty of land status (State and Native selections) have thwarted a comprehensive effort to enhance recreational opportunities by BLM. There is an opportunity to increase recreational use near Nome by taking advantage of the infrastructure that currently exists (BLM campground, road, and public/private services available). Two areas of promise are the Kigluaik Mountains/ Salmon Lake area as well as the Bendeleben Mountains. In other areas such as the Squirrel and Koyuk river areas, current use (primarily commercial guiding) has created conflicts with various user groups and the local resources which may require the BLM to actively manage the recreation program to limit such conflicts. Some areas have unique habitat features which may also benefit from increased recreational management in an effort to continue existing natural conditions on the landscape. This habitat includes essential fish rearing, big game browse areas (primarily moose and caribou), and healthy numbers of prized non ungulate wildlife species (grizzly bear, wolves, and wolverine). These areas would include the Fish River/McCarthy's Marsh area, Buckland and Tagagawik River areas and the Agiapuk, Ungalik, Inglutalik, and Shaktoolik rivers. This listing is certainly not inclusive as nearly every major river within the planning area exhibits many of these habitat features. However, commercial recreational use levels and changing hunting and fishing regulations under State law as well as Federal subsistence management and fish crashes in Norton Sound have elevated the awareness of these identified areas.

## b) Special Recreation Permits, Commercial Uses, and Fee Use Areas

Section 4(c) of the Land and Water Conservation Fund Act allows for the issuance of special recreation permits for "uses such as group activities, recreation events, motorized recreation vehicles, and other specialized recreation uses." The issuance of such special recreation permits is not mandatory; the Act states that such special permits "may be issued in accordance with procedures and at fees established by the agency involved."

Commercial recreational use is authorized through 43 CFR 2930, Permits for Recreation on Public Lands. A final rule and a proposed rule (dealing with term lengths of permits) were published in the Federal Register Vol. 67, No. 190, pages 61732-61745 on October 1, 2002. A final rule for the term length was published February 6, 2004 and became effective on April 1, 2004. This final rule allows BLM, in its discretion, to issue a 10-year Special Recreation Permit (SRP).

Commercial recreational use varies from year to year but generally 12-14 SRPs are issued or reauthorized for hunting/guiding activities. Roughly half of the hunting/guiding permits are authorized in the Squirrel River area and the other half in the Nulato Hills and upper Koyuk River area. Two world class competitive events (the Iditarod and Iron Dog races) occur within the planning area and are also permitted. Other smaller snow machine and dog sled events occur within the planning area on existing trails.

The planning area has seen an increase in commercial recreational use, due largely to BLM lands being available to big game guides and through closures to moose hunting by non-residents in adjacent areas. BLM lands in the Squirrel River are surrounded by lands managed by the NPS and FWS that limit guide and outfitter use. BLM lands also carry somewhat healthy moose populations and the largest caribou herd in Alaska, making them ideal for both guided and unguided hunts. There are currently no limits on the number of recreational permits that can be issued within the planning area. Current management does not require companies offering transporter services to access BLM lands for recreational use to obtain a permit.

The level of commercial hunting operations permitted by the BLM, in conjunction with transported resident and non resident hunters and local subsistence and sport use has caused significant adverse public reaction within some BLM-managed lands within the planning area. In the Squirrel River, the increased level of recreational use and the associated harvest of wildlife (moose and caribou primarily) caused BLM to attempt to create an integrated activity plan (IAP) to address recreational use levels. Although a draft IAP was completed in the mid 1990s the plan was never adopted.

The level of use by non-local and non-resident hunters in Game Management Unit 23 has increased substantially since 1989. For example, the average number of non-resident moose hunters in Unit 23 from 1979 to 1988 was 60, compared to 136 for 1991-2000 (Dau 2002a). During the same timeframe, non-local resident moose hunters in Unit 23 increased from an average of 93 to 158 (Dau 2002a). Hunting of WACH caribou by non-local hunters is concentrated in Unit 23. According to Dau (2003b) since the 1998-99 regulatory year, 73 percent of all non-local hunters pursuing caribou (from the WACH) hunted in Unit 23. An average of 91 percent of this non-local hunting effort occurred in late August through September, the same time frame as the non-resident moose season. From 1998 to 2001 the average number of non-local and non-residents caribou hunters in Unit 23 was 440.

The Unit 23 User Issues Group, with a broad base of stakeholders, and funded by ADF&G, was initiated in January 1999 in Kotzebue. This group met seven times in Kotzebue, Kiana, and Shungnak through August 2000. During this process two areas were identified as of highest concern, the upper Kobuk River and the Squirrel River. The group felt that during the 10 years prior to 1999 there had been increasing numbers of sport hunters coming to northwest Alaska. Local people saw this as a threat to subsistence opportunity and culture. Commercial operators were concerned with maintaining their economic livelihood. Recreational visitors/hunters/fishers wanted to maintain a high quality recreation opportunity. All involved agreed that the pattern of more people and fewer animals is likely to continue in northwest Alaska, and that this region is feeling the overflow of use from more developed parts of Alaska, the Lower 48, and Europe. Unfortunately in late 2000 ADF&G funding ran out, and they were unable to hire a planner to continue with this process, as they had hoped to do.

The issue of rising use levels continues to be a concern. Rising levels of hunting pressure has caused the ADF&G to limit non resident moose harvest tickets for the first time in 2005 to 12 harvest tickets for the Squirrel River. Resident hunters are now required to obtain a permit tag

within the game management unit. These proactive approaches taken by the State are an attempt to reduce hunting pressure. Residents of the area have expressed concern over use levels changing animal behavior and migration patterns, waste of game meat, OHV use, overcrowding, and increased pressure on subsistence resources. There have been several documented cases of conflicts between subsistence and non-local hunters.

In 2004, the tribal governments of Koyuk and Shaktoolik protested a BLM decision to grant a commercial use permit to a hunting guide within the Koyuk and Shaktoolik rivers. Conflicts over commercial recreational sport hunting were the root of the protest. While the BLM recognizes and acknowledges the State's role in game management, it must also recognize the direct correlation between permitting guides and transporters who make a profit off of BLM-managed lands and the conflict over increased recreational use that the guides and transporters cause. These conflicts are causing a loss of quality recreational opportunities.

Though section 4(b) of the Land and Water Conservation Fund Act authorizes Federal agencies that provide specialized outdoor recreation sites, facilities, equipment, and/or services at Federal expense to charge for the use, there are no fee use areas within the entire 13 million acre planning area.

There is one public campground at Salmon Lake, which is accessible by a State maintained gravel road 40 miles north of Nome. Facilities at the campground include a one mile spur road to a common camping area containing six camping sites with fire pits and picnic tables, a natural boat launch at the shore of Salmon Lake, and an outhouse. The BLM provides trash and sewage disposal within a limited budget. Generally the campground is opened shortly after the Nome-Kougarok Road is plowed free of snow (early June) and remains open until mid October, depending upon snow and road conditions. The Salmon Lake area offers outstanding recreational opportunities. It is the spawning grounds for the most northern run of sockeye salmon in the United States. Opportunities exist to enhance the campground facilities within the framework of a larger recreational area of nearby BLM-managed lands with remarkable scenic value, the Kigluaik Mountains.

Features of interest within the Kigluaik Mountains include carbonate rock habitats that support rare plants, well developed periglacial features, classic glacially sculpted erosional and depositional landforms, small glaciers and moraines, exposed, highly metamorphosed rocks from deep in the earth's crust, and limited gyrfalcon and snow bunting populations and habitat. One of the plant species of interest, *Artemisia senjavinensis*, is a BLM sensitive species. Garnet peridotite found on the surface of Mount Osborn probably formed at more than 28 miles deep in the earth's crust. This may be the deepest crustal rocks now in surface exposure in North America. Glaciated valleys offer excellent winter and summer hiking opportunities. Some lakes supports a unique population of Arctic char and Crater Lake is the source of a water pipeline built to develop the gold placers of the Nome mining districts. This 30 inch pipeline made of redwood slats held together with iron hoops gives a glimpse of the rich mining history of the Seward Peninsula. Much of this pipeline remains after nearly 100 years. Abrupt mountain peaks over 3,000 feet are readily accessible and some canyons near Mosquito Pass have cirque lakes which offer outstanding photo opportunities. A variety of unique wildlife and vegetation also exists. The Kigluaik Mountains have been seeing increased visitor use in recent years. Helicopter charters are now available out of Nome to view some of the spectacular vistas. The area is readily accessible from the Nome Road system. Various economic development groups in Nome have discussed increasing tourism potential as a way to stimulate the economy and the Kigluaik Mountains in conjunction with the facility at Salmon Lake Campground offers an opportunity to assist in reaching this goal.

As discussed previously on page 3-210 under the General Recreation section, recent annual dispersed visitor use for the planning area is estimated at 2,000 visitor user days (BLM 2005k). SRPs add substantially to disperse visitor use from events such as the Iditarod Trail sled dog and Iron Dog snowmobile races, as well as commercial guiding. Exact numbers of visitors is unknown and difficult to collect. Individuals and organizations that obtain an SRP are required to provide the BLM with "user day" information. The BLM does not have a system in place for tracking dispersed visitor use by the local population, transported visitors (predominately non-guided hunters), or independent travelers.

## c) Recreation Opportunity Spectrum

As part of this planning effort, the Fairbanks District Office classified existing recreation opportunities available across the planning area using ROS classes. Recreation Opportunity Spectrum (ROS) is a framework for classifying and defining different classes or types of outdoor recreation environments, activities, and experience opportunities. The classification describes the recreational opportunities that currently exist on BLM-managed lands across the landscape (Map 3-31 and Table 3-33).

**Table 3-33. ROS Class Acreages and Descriptions**

| Class<br>(acres / % of planning area) | Description |
|---|---|
| Primitive<br>173,000 acres (1.3%) | Area is characterized by essentially unmodified natural environment of fairly large size. Concentration of users is low and no conflicts with users are evident. Sights and sounds of road systems are nonexistent and area is remote. Human-built structures are few and far between, or are inconspicuous. Vegetation and soils remain in a natural state. Example: Higher elevations of the Kigluaik Mountains. |
| Semi-Primitive Non-Motorized<br>0 acres (0%) | Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other area users. Area is generally free of motorized trails and roads. Sights and sounds of transportation systems (mainly air) are encountered. Local traditional subsistence use is evident but impacts are fairly minimal. Vegetation and soils are predominantly natural but some impacts exist. |
| Semi-Primitive Motorized<br>12,927,000 acres (98.45%) | Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. Area is accessible to specialized OHVs but is generally not accessible to most four-wheel drive vehicles. Sights and sounds of the road system may or may not be dominant. Some portions of the area may be distant from road systems, but all portions are near motorized trails. Vegetation and soils are predominantly natural but localized areas of disturbance may exist. Local traditional subsistence use is evident but environmental impacts are minimal. Example: Ivan Hoe/Guy Rowe Creek. |

| Class (acres / % of planning area) | Description |
|---|---|
| Roaded Natural<br>33,000 acres (0.25%) | Area is characterized by a generally natural environment with moderate evidence of the sights and sounds of humans. Resource modification and utilization practices are evident, but harmonize with the environment. Concentration of users is low to moderate, and rustic facilities may exist for user convenience and safety. The area is accessible to conventional motorized vehicles and roads are maintained on a rular basis. Sights and sounds of the road system are evident and traffic levels may be highly variable. Areas of localized vegetation and soil impacts exist. User concentrations are low to moderate but may be high in popular recreational sites such as waysides, trailheads, and water access points. Example: Nome-Teller Road, Feather River to Tisuk River, Pilgrim Hot Springs Road, Salmon Lake Campground. |
| Rural<br>0 acres (0%) | Area is characterized by a substantially modified natural environment. Resource modification and utilization practices are obvious. Sights and sounds of humans are readily evident and concentration of users is moderate to high. Some facilities may be designed for use by a large number of people. Areas typically are readily accessible to conventional motorized vehicles and are in areas where other camp structures are fairly common. Traffic levels are fairly constant. Areas of modified soil and vegetation exist. |
| Urban<br>0 acres (0%) | Area is characterized by a highly modified environment, although the background may have natural elements. Vegetation is often exotic and manicured. Soils may be protected by surfacing. Sights and sounds of humans predominate. Large numbers of users should be expected. Modern facilities may exist for the convenience and comfort of large numbers of people. |

INSERT 11x17 MAP
**3_31_rec_ros**

# 5. Travel Management/OHV

## a) Travel Management

Due to the lack of roads, access to BLM-managed lands is limited to human power (foot, skis, snowshoes, bicycle); remote landings by small planes capable of landing on river gravel bars, remote landing strips or adjacent hillsides; helicopters, snowmobiles, or dog teams; river boats; and off-highway vehicles (OHVs).

### (1) Roads

There are three major roads leading out of Nome maintained by ADOT totaling nearly 250 miles (Map 3-32). Lesser secondary roads also exist on the Seward Peninsula, which are largely not maintained. These include the Pilgrim Hot Springs Road, Buster Road, Bunker Hill–Kougarok, Candle Creek Road, Tin City-Goodwin Road, Lost River-U.S. Tin Road, Shovel Creek Road, Big Hurrah Road, Casadepaga Road, Deering-Inmachik Road, and Snake River Road. Lands accessed along the three major roads and secondary road systems are primarily in State and private ownership. However, these roads do provide a level of access not found elsewhere in the planning area. Except for local roads within communities, there are no other publicly maintained roads within the planning area either within or adjacent to BLM-managed lands.

### (2) Trails, R.S. 2477 Routes, and 17(b) Easements

Other than specific 17(b) easements reserved through Native corporation lands and the Iditarod National Historical Trail, there are no designated BLM trails within the planning area. The State has numerous R.S. 2477 rights of way assertations pending. A significant number of winter trails exist. There are 965 miles of trails within the Northwest Arctic Borough and some 1,326 miles of trails within the Seward Peninsula/Norton Sound area that have been identified by ADOT (Map 3-32). The majority of these winter trails are inter- or intra- community access trails. In many instances, trails used for these purposes are not marked.

### (3) Airstrips

All communities within the planning area have established air strips owned and maintained by the State. No remote, public airstrips have been developed by the BLM. Access on BLM-managed lands by air is limited to remote landings by small planes capable of landing on river gravel bars, remote landing strips, or adjacent hillsides.

## b) Off-highway Vehicle Management

Under Section 202(c) (3) (E) of the Sikes Act, the Secretary of Interior was instructed to “require the control of off road vehicle traffic” on public lands. Executive Orders 11644 and 11989 established policies and provided procedures to ensure that the use of off road vehicles on public lands (excluding Indian lands, lands under the custody and control of the Tennessee Valley Authority, and lands under control of the Secretary of Defense) would be controlled.

The definition of off road vehicles excluded any registered motorboat, and fire, military, emergency, or law enforcement vehicle when used for emergency purposes, any combat or

combat support vehicles when used for national defense purposes, and any vehicle whose use is expressly authorized by permit, lease, license or contract or official use by an employee, agent, or designated representative of the Federal Government or one of its contractors in the course of his employment, agency, or representation. The Executive Orders required closure of lands to OHV use if the use is "causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources." Federal Agencies were given six months to promulgate regulations to enforce the Executive Order(s).

Under 43 CFR 8360, Visitor Services, the Authorized Officer of BLM has the authority to close or restrict lands under BLM jurisdiction (43 CFR 8364.1). Rules of Conduct on public lands are governed under 43 CFR 8365 and address sanitation, occupancy and use, public health, safety and comfort, property and resources, supplementary rules, state and local laws, and developed recreation sites and areas.

All BLM-managed lands are required to have OHV designations (43 CFR 8342.1) and must be designated as open, limited, or closed. "Open" designations are used primarily for sites selected for intensive OHV recreation, where there are no compelling resource protection needs, user conflicts, or public safety issues that warrant limiting cross-country use. Open areas are where all types of vehicle use is permitted. On lands that are designated as "limited", the area is restricted for certain times, areas, and/or to certain use. The restrictions can be of any type but generally fall within the following type of categories: number of vehicles; types of vehicles; time or season of use; permitted or licensed use only; use on existing roads and trails; or use on designated roads and trails. Weight class of OHVs has often been used in Alaska to limit use especially in rural areas where ANILCA subsistence use is protected. The authorized officer of BLM must provide information to the public on OHV designated areas and any restrictions placed within areas designated. Lands designated as "closed" are closed to OHV use except for use approved by the authorized officer of the BLM.

Currently, the planning area is undesignated. Although, the Northwest MFP institutes a maximum 2,000 pound gross vehicle weight limit (GVW) without a permit.

The current State policy on casual (non-permitted) OHV use on State lands is addressed by direction in the AAC at 11 AAC 96.020 and 96.025, "Generally Allowed Uses on State Land." Use of highway vehicles with a curb weight up to 10,000 pounds or recreational-type vehicles (i.e., OHVs) with a curb weight of less than 1,500 pounds is allowed on or off an established road easement if use off the road easement does not cause or contribute to water quality degradation, alteration of drainage systems, significant rutting, ground disturbance, or thermal erosion. To prevent damage to wetlands, stream banks, and other areas with poorly drained soils, prevent erosion and wildlife disturbance or displacement, and provide access to public lands, the ADNR may designate certain State lands as "Special Use Lands." Restrictions to protect resource values or manage use, in addition to the Generally Allowed Use restrictions, are administratively implemented through regulations implementing a Special Use Land Designation.

OHV use is a nationally recognized, major recreational activity on BLM-managed lands. Regionally, OHV use is increasing. The popularity of the Iditarod Dog Sled and Iron Dog races is drawing visitors to the planning area. Many visitors are enjoying the area's winter trail systems. Population increases and higher disposable income rates of residents within the planning area will add further OHV use.

Local residents are heavily engaged in subsistence activities and the public lands adjacent to communities throughout the planning area provide ideal opportunities for harvesting renewable resources. Local OHV use is predominately for subsistence harvesting. Snowmobiles are the primary means of transportation within the scattered isolated communities encompassed within the planning area during the winter months (November-May). OHVs, mostly all terrain vehicles, are used in the summer and fall months. Motor boats are commonly used in rivers. Primary inter village trails are along 17(b) easements. Game movements and location of traditional fishing, hunting, trapping, and gathering areas influence access outside of recognized easements.

Summer OHV use is centered on personal recreation, and subsistence based gathering (fish, berries, greens, roots) usually occurring from early June through August. In September, use shifts from recreation-based to use in support of hunting. The beginning of the subsistence, sport, and commercial hunting season brings an increase in OHV use of BLM-managed lands. No OHV use monitoring has been established except for annual inspections of guiding operations within the Squirrel River. OHV use in the Squirrel River has been rising to support of commercial guiding operations.

Types of OHVs used in the planning area take many forms but the vast majority are the standard “4-wheelers.” Larger OHVs (“six wheelers” and Argos) and tracked vehicles are used infrequently. Use of OHVs larger than 2,000 pounds GVW has been targeted by law enforcement and actions have been taken in the past to stop such use on BLM administered lands in the planning area.

Winter snowmobile use within the planning area offers mainly backcountry and hill climbing experiences, with packed trails limited to major travel routes. Most winter activity is subsistence based hunting and trapping. Recreational activities are also supported by snowmobile. Organized events that center on snowmobile use are gaining popularity in the planning area such as the Iron Dog race, and events centered on the Iditarod Trail. This overall increase in use has made quiet winter recreational experiences harder to find except for very remote mountain peaks. Mountainous terrain is limited in the planning area and almost all areas can be accessed by aggressive snowmobile use. The increase is tempered by the remoteness of the area and small resident population base. Snowmobiles and OHVs are now capable of reaching backcountry wildlife habitat that was previously inaccessible.

No inventory of trails on BLM-managed land currently exists within the planning area and aside from recognized easements and a few trails in support of commercial guiding, trail use, and its potential effect on the environment are largely unknown. Continued summer OHV use in a wet environment, dominated by tundra and muskeg vegetation often leads to muddy bogs that become greater obstacles as thermal erosion from vegetation stripping and continued use occurs. This results in users creating detours around the mud holes, creating a braided trail pattern. These widened trails not only leave a visual scar on the landscape, they also contribute to vegetation and soil damage (Meyer 2002).

INSERT 11x17 MAP
**3_32_travel_mgmt**

# *6. Renewable Energy*

Consideration of renewable energy sources available on the public lands has come to the forefront of land management planning as demand for clean and viable energy to power the nation has increased. To date there has been no demand for development of renewable energy projects on BLM-managed lands within the planning area. In cooperation with the National Renewable Energy Laboratory (NREL), BLM assessed renewable energy resources on public lands in the western United States (BLM and DOE 2003). The assessment reviewed the potential for concentrated solar power, photovoltaics, wind, biomass, and geothermal on BLM, BIA, and USDA Forest Service lands in the West. Unfortunately, Alaska was not included in this report. Following is a brief discussion on renewable energy in the planning area.

## a) Photovoltaics (PV)

Photovoltaic (PV) technology makes use of semiconductors in PV panels (modules) to convert sunlight directly into electricity. Criteria used for determining potential include amount and intensity of sunlight received per day, proximity to power transmission lines, and environmental compatibility. To date, the Fairbanks District Office has not authorized any PV facilities for commercial power production, nor has any interest been expressed by industry in developing such facilities on BLM-managed lands within the planning area.

## b) Wind Resources

There is increasing interest in wind energy development in Alaska. The Alaska Energy Authority and rural utilities are considering the development of wind power projects at many villages. There is an ongoing program to assess wind energy resources in western and southwestern Alaska and to develop a high-resolution wind map for this area (http://www.eere.energy.gov/windandhydro/windpoweringamerica/wind_maps_none.asp). Development of this map will increase understanding of Alaska's wind resource and allow communities to more easily apply for U.S. Department of Energy (DOE) wind energy funding programs. In February 2005, the Governor of Alaska established a Rural Energy Action Council to report on short-term proposals to reduce the cost of energy in the bush. One issue the Council will address is acceleration of wind turbine generator installations.

The potential to use wind as a supplemental energy source for local communities within the planning area is high. According to DOE the coastal areas of northwestern Alaska have excellent potential for wind energy (DOE 2001b). Most of the communities in the planning area rely on diesel-powered generating stations. The cost of generating electricity in this manner is very high. Using wind turbines along with diesel generation can save significant amounts of fuel. Several communities in the planning area including Kotzebue, Wales, and Selawik already use wind energy to supplement diesel-powered generating stations.

The potential of a large wind farm within the planning area is low. The population in the area is low and infrastructure to transport electricity outside of the region does not exist. The potential for development of wind energy on BLM-managed lands is also low. The best sites are near the coast and to be effective, need to be close to communities. Most of the land around villages is owned by Native corporations and the BLM manages very little land along the coast.

## c) Biomass

The biomass program is the use of is the use of organic matter waste products for production of products such as paper and pulp, value-added commodities, and bio-energy or bio-based products such as plastics, ethanol, or diesel. There is some interest in biomass in Alaska. The State has sought DOE funding to investigate fish oil and diesel blends, conversion of wood residues to fuel grade ethanol, conversion of fish and wood waste to Btu gas, and replacement of oil-fire boilers with wood-fired boilers to reduce energy costs in rural communities. Most of these projects are situated in southeastern Alaska where there is commercial timber and a large commercial fishery.

The National Energy Policy recommends development of a strategy to encourage the use of biomass from public lands as a source of renewable energy. The potential for the use of biomass from public lands within the planning area is very limited. Only 8 percent of the planning area is forested and there are no commercial logging operations. No vegetative treatments have been conducted in the past and the probability of future treatments is low. The area is roadless, making the economics of accessing the low amount of biomass available questionable. There is no known market for these types of products in the region.

# *7. Lands and Realty Actions*

Land actions constitute resource allocations, and, as such, are made through a variety of means but generally fall into five broad categories: use authorizations, disposal actions, acquisitions, exchanges, and withdrawals. Each proposal or application for a lands action is considered on a case-by-case basis and is either authorized or rejected. Generalized land status for the planning area is shown on Map 1-1 and Map 3-33.

The primary objective of the lands program in the planning area is to provide the public with the land it needs for rights-of-way, land use permits, leases, and sales. The secondary objective is to provide support to other programs to protect and enhance the resources. Overlaying these first two objectives is the need to support the Alaska Land Transfer Acceleration process, which involves the survey and conveyance of lands to the State, Native corporations, Native allottees, and other inholders. The final goal of all these objectives is a balance between land use and resource protection that best serves the public at large.

## a) Land Use Authorizations

### *(1) Unauthorized Use/Trespass*

It is the responsibility of the BLM to protect the public's best interest in regards to BLM-managed lands. Over the years, individuals have built structures for various purposes (e.g., occupancy, commercial uses, and recreational uses) on public land without authorization. The BLM attempts to manage this problem through a program of detection, control, and abatement. The size of the planning area makes a complete inventory difficult and a number of trespasses have been identified. Once a trespass has been identified it is handled in one of three ways:

If the structure is used for allowable purposes as defined by Sec. 302 of FLPMA, and is compatible with other resource management objectives, the trespass can be controlled by authorizing it under a specific set of conditions.
If the structure is not allowable under FLPMA, but is compatible with other resource objectives, it could be transferred to Federal ownership and maintained as a public use cabin or for administrative purposes.
If the structure is not allowable under FLPMA and is either unsuitable for public use or is incompatible with other management objectives, it is removed.

### *(2) Use Authorizations*

Use authorizations respond to public demand for specialized and more or less temporary uses of the public lands. Examples are right-of-way (ROW) grants, airport leases, Recreation and Public Purposes (R&PP) leases, and all FLPMA leases, permits, and easements. These do not cause the lands to leave the public domain, although they may restrict or benefit certain uses. They may be set for a period of time or may be open-ended. They tend to cover small, scattered areas and cannot be anticipated through the planning process.

#### (a) Airport Leases

The Act of May 24, 1928, as amended, authorizes the Secretary of the Interior to lease for use as a public airport any contiguous unreserved and unappropriated public lands not to exceed 2,560 acres in area. In accordance with the regulation, those lands leased for airport purposes will not be subject to appropriation under the public land laws, including the mining laws. There are no pending airport lease applications.

#### (b) R&PP Leases

The Act of June 14, 1926, as amended, commonly known as the Recreation and Public Purposes Act, authorizes the Secretary of the Interior to lease public lands other than those that are 1) lands withdrawn or reserved for national forests, national parks and monuments, and national wildlife refuges, 2) Indian lands and lands set aside for the benefit of Indians, Aleuts, and Eskimos, and 3) lands which have been acquired for specific purposes under conditions set forth in 43 CFR 2740 and 2912. Under these regulations, lands leased for R&PP are segregated from entry under the public land laws, including the mining laws (43 CFR 2091.3-2). There are no R&PP leases issued or pending.

#### (c) FLPMA Leases and Permits

Sec. 302 of FLPMA contemplates a wide variety of land uses for lease and permit including, but not limited to, habituation, cultivation, and the development of small trade or manufacturing concerns. In general, leases are for long-term land uses while permits are used to authorize short-term land uses or uses with little impact. This section of the Act is implemented by regulations in 43 CFR 2920 and BLM Manual 2920, which define these uses further to exclude private recreational habitation such as seasonal use cabins. All such proposals are to be reviewed under the criteria established by FLPMA on a case-by-case basis and require a site specific environmental assessment. There are a few permits and no leases authorized in the planning area.

### (d) FLPMA Easements

A FLPMA easement is an authorization for a non-possessory interest in lands that specifies the rights of the holder and the obligations of the BLM to use and manage the lands in a manner consistent with the terms of the easement. For example, easements may be used to assure that uses of public lands are compatible with non-Federal uses occurring on adjacent or nearby land. There are no FLPMA easements authorized or pending in the planning area.

## b) Disposal Actions

Discretionary disposal actions are usually initiated in response to public requests or applications. These actions result in a transfer of title, and the lands leave the public domain. Examples are exchanges, airport conveyances, R&PP sales, and FLPMA sales. Disposals such as airport conveyances and most R&PP sales include reversionary clauses if the land is no longer used for the purpose conveyed. FLPMA sales and exchanges are generally absolute.

Non-discretionary disposal actions such as Native and State conveyances, and Native allotments are not subject to the planning process.

### *(1) Airport Conveyance*

The Airport and Airway Improvement Act of September 3, 1982, and 43 CFR 2640 authorize and regulate the issuance of conveyance documents for lands under the jurisdiction of the DOI to public agencies for use as airports and airways. Under the regulations those lands proposed for conveyance are segregated from appropriation under the public land laws, including the mining laws. Furthermore, airport patents contain provisions allowing for reversion of the lands to the United States under certain circumstances. The only pending airport conveyance in the planning area is at Kotzebue.

### *(2) R&PP Sales*

The Act of June 14, 1926, as amended, commonly known as the Recreation and Public Purposes Act, authorizes the Secretary of the Interior to convey those public lands other than 1) lands withdrawn or reserved for national forests, national parks and monuments, and national wildlife refuges, 2) Indian lands and lands set aside for the benefit of Indians, Aleuts, and Eskimos, and 3) lands which have been acquired for specific purposes, under conditions set forth in 43 CFR 2740. Though minerals remain reserved to the United States, there is no provision for mineral entry or development on R&PP patents. R&PP patents contain provisions allowing for reversion of the lands to the United States under certain circumstances; in some cases the reversionary clause is limited to 25 years. There are no pending sales. There are two patented R&PPs with reversionary clauses in the planning area: a Boy Scout camp and a Girl Scout camp in the Nome area.

### *(3) FLPMA Sales*

Section 203 of FLPMA establishes criteria under which public lands may be considered for disposal. In general, all such proposals are to be reviewed under the criteria established by FLPMA on a case-by-case basis and will require a site specific environmental assessment. There are no pending FLPMA sales.

# c) Acquisitions

FLPMA authorizes the acquisition of real property where it is consistent with the mission of the department and departmental land use plans. No acquisitions have been made or are pending in the planning area.

## *(1) Exchanges*

Sec. 1302(h) of ANILCA authorizes the Secretary of Interior to exchange public lands or interests (including Native selection rights) for non-Federal lands and interests. No exchanges have been made or are pending within the planning area.

## *(2) Withdrawals*

A withdrawal is a formal action that sets aside, withholds, or reserves Federal lands by administrative order or statute for public purposes. The effect of a withdrawal is to accomplish one or more of the following:

- Segregate and close Federal land to the operation of all or some of the public land laws and one or more mineral laws,
- Transfer total or potential jurisdiction of Federal land between Federal agencies, and
- Dedicate Federal land for a specific public purpose.

Millions of acres in the planning area are withdrawn by public land orders issued pursuant to Section 17(d)(1), 17(d)(2) of ANCSA. In addition various withdrawals have been made under Sections 11 and 14 of ANCSA for Native selections, and under 17(d)(1) for state selections. The withdrawals are a series of public land orders issued since 1972 that placed a protective withdrawal on Federal lands for the purpose of study and review, and to facilitate conveyances.

Public Land Order (PLO) 6744 on October 5, 1983, addressed most of these withdrawals in the planning area south of the North Slope Borough. However, selected lands and lands under the Koyuk and Squirrel Wild and Scenic River study areas were not included in the PLO. Any underlying withdrawals remaining in effect will need to be addressed once conveyance to State and Native corporations are completed. In the case of the wild and scenic rivers, the Koyuk was determined not suitable, and the legislative withdrawal for the WSR study expired. PLO 5180 segregates these lands against mineral entry (except metalliferous minerals) and leasing. The Squirrel River has been recommended to Congress as not suitable, and the study withdrawal will expire on November 17, 2007 if Congress takes no action. Unselected lands in the study corridor are subject to PLO 5179, which segregates against mineral entry and leasing.

In addition, there are hundreds of acres of administrative, recreation, power site, military, and other withdrawals in place, many of which were created for a specific purpose that may now be obsolete.

A listing of all withdrawals can be found in the tables following this section.

# d) Access Corridors

There are two legislatively designated access routes in the planning area. ANILCA Sec. 201(2) designates a winter route on an existing trail between Deering and the Taylor Highway.

ANILCA Sec. 201(4)(b) designates access between Bornite and the Dalton Highway. The majority of these routes are not on public land.

**Table 3-34. Withdrawals Affecting BLM Land**

| Withdrawal | Authority | Serial # |
|---|---|---|
| (d)(1) | PLO 5169 | FF-086061 |
| (d)(1) | PLO 5170* | FF-016298 |
| (d)(1) | PLO 5171 | FF-016299 |
| (d)(1) | PLO 5179* | AA 061299 |
| (d)(1) | PLO 5180* | FF 016304 |
| (d)(1) | PLO 5184* | FF 085667 |
| (d)(1) | PLO 5186 | AA 061005 |
| (d)(1) | PLO 5187 | FF 086064 |
| (d)(1) | PLO 5353 | AA 066614 |
| Hot Springs | PLO 399* | AA 064725 |
| Squirrel River | ANILCA 604(a) | FF 085186 |
| Pass Creek PSR | PSR 726 | FF 085798 |
| Salmon Lake PSC | PSC 403 | AA 006202 |

*Partially modified by PLO 6477 (1983) which opened most unselected lands south of the N. Slope Borough to the land laws.

**Table 3-35. Withdrawals for Other Agencies Excluding ANILCA**

| Serial # | Agency | Withdrawal | Type | Acres | Segregation | Recommendation |
|---|---|---|---|---|---|---|
| F 022956 | DOD | PLO 2020 | Kivalina National Guard (NG) | 0.54 | Closed to all forms of appropriation except mineral leasing and mineral materials disposal | Maintain |
| F 022958 | DOD | PLO 2020 | Koyuk NG | 0.58 | Closed to all forms of appropriation except mineral leasing and mineral materials disposal | Maintain |
| F 022963 | DOD | PLO 2020 | Noatak NG | 0.50 | Closed to all forms of appropriation except mineral leasing and mineral materials disposal | Maintain |
| F 031044 | DOD | EO 1036 | Nome Army Site | 3.51 | Closed to all-reserved for US Army Telegraph site | Maintain |
| F 022965 | DOD | PLO 2020 | Shishmaref NG | 0.55 | Closed to all forms of appropriation except mineral leasing and mineral materials disposal | Maintain |
| F 031968 | FAA | PLO 3830 | Kotzebue Airport | 140 | Closed to all forms of appropriation except mineral leasing | Maintain |
| FF 000480 | FAA | ANS 197 | Kotzebue Airport | 34.16 | Closed to all forms of appropriation except mineral leasing and mineral disposal | Maintain |
| F 024760 | FAA | PLO 2642 | Nome ANS | 1.38 | Closed to all-air navigation site | Maintain |
| F 027227 | FAA | PLO 2854 | Nome VORTAC | 64.92 | Closed to all-air navigation site | Maintain |
| F 022957 | DOD | PLO 2020 | Kotzebue NG | 0.35 | Closed to all forms of appropriation except mineral leasing and mineral materials disposal | Reported to GSA |
| F 031049 | GSA | EO 4/16/03 | Nome Customs | 1.13 | Closed to all-reserved for U.S. Customs Site | Maintain |
| FF 082011 | USAF | PLO 1876 | Tin City Navy | 6.31 | Closed to all forms of appropriation except mineral material disposal | Reported to GSA |
| FF 000384 | PHS | PLO 4497 | Kotzebue Hospital | 14.10 | Closed to all forms of appropriation except mineral leasing | Maintain |
| F 013247 | U.S. Air Force | PLO 1534 | Anvil Mountain USAF | 11.74 | Closed to all-reserved for military purposes | Maintain |
| F 011996 | U.S. Air Force | PLO 2034 | Cape Lisburne | 1,091 | Closed to all-reserved for military purposes | Maintain |
| F 014487 | U.S. Air Force | PLO 1664 | Granite Mountain USAF | 223.59 | Closed to all-reserved for military purposes | Maintain |
| F 010085 | U.S. Air Force | PLO 883 | Kotzebue USAF | 508.29 | Closed to all-reserved for military purposes | Maintain |
| F 012723 | U.S. Air Force | PLO 1571 | Point Lay | 1,432.46 | Closed to all-reserved for military purposes | Maintain |
| F 010087 | U.S. Air Force | PLO 1672 | Tin City USAF | 6.31 | Closed to all-reserved for military purposes | Maintain |

| Serial # | Agency | Withdrawal | Type | Acres | Segregation | Recommendation |
|---|---|---|---|---|---|---|
| AA066625 | U.S. Coast Guard | EO 4257 #16 | Grantley Harbor | 70 | Closed to all-reserved for lighthouse purposes | Maintain |
| F 027632 | U.S. Coast Guard | PLO 2650 | Pt Spencer Light | 2,482.54 | Closed to all-reserved for lighthouse purposes | Maintain |
| F 031043 | U.S. Coast Guard | EO 4257 #42 | Sledge Island | 700 | Closed to all-reserved for lighthouse purposes | Maintain |
| F 012716 | U.S. Navy | PLO 1571 | Cape Sabine | 454.42 | Closed to all-reserved for military purposes | Maintain |
| F 012722 | U.S. Navy | PLO 1571 | Icy Cape | 156.06 | Closed to all-reserved for military purposes | Maintain |

INSERT 11x17 MAP
**3_33_allotments**

# D. Special Designations

## *1. Areas of Critical Environmental Concern and Research Natural Areas*

### a) ACECs

#### *(1) Background*

Areas of Critical Environmental Concern (ACECs) are a designation unique to the BLM. BLM regulations (43 CFR Part 1610) define an ACEC as an area "…within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards." While an ACEC may emphasize one or more unique resources, other existing multiple-use management can continue within an ACEC so long as the uses do not impair the values for which the ACEC was designated. Section 202 (c)(3) of FLPMA mandates the BLM to give priority to the designation and protection of ACECs in the development and revision of land use plans. BLM manual 1613 describes the process followed to nominated ACECs and screen areas for their suitability for ACEC designation.

Currently, there are no designated ACECs within the planning area.

#### *(2) Nominated Areas*

During the scoping process for the Kobuk-Seward Peninsula RMP, the Fairbanks District Office actively solicited nominations and comments from the public on areas that should receive consideration as ACECs. A total of eight nominations were received from the public and BLM specialists (Map 3-34). Several of these nominations are in areas that overlap. The nominations were as follows:

- Nulato Hills ACEC – nominated by Western Arctic Caribou Herd (WACH) Working Group[3]
- Inglutalik Watershed ACEC – nominated by the Alaska Coalition
- Ungalik Watershed ACEC – nominated by the Alaska Coalition
- Shaktoolik Watershed ACEC – nominated by the Alaska Coalition
- Kigluaik Mountains ACEC – nominated by BLM specialists
- Upper Kuzitrin River ACEC – nominated by BLM specialists
- McCarthy's Marsh ACEC – nominated by BLM specialists
- Western Arctic Caribou Insect Relief and Calving Grounds – nominated by the WACH Working Group

[3] This Working Group is a regional organization of representative stakeholders with a direct interest in the care and management of the WACH. Establishment of the Working Group was facilitated by ADF&G and several Federal agencies. Resource agencies including ADF&G, FWS, BLM, NPS, and BIA support the Working Group in a non-voting capacity.

### *(3) Potential ACECs*

Based on interdisciplinary review, the following areas met both the relevance and importance criteria and will move forward for additional consideration as alternatives within this Environmental Impact Statement. For more specific information on specific measures proposed for these areas, see the detailed alternative comparison tables in Appendix B.

#### (a) Nulato Hills

The Nulato Hills are regionally significant. The area is a critical wintering area for the WACH. As of July 2003 this herd numbered at least 490,000 caribou which makes it one of the largest caribou herds on the continent. Although caribou are known for their wandering lifestyle and ever-changing distribution, the Nulato Hills were a critical portion of WACH winter range during the mid 1980s to mid 1990s, and has received heavy use during some winters since that time. Winter in the subarctic is a nutritionally demanding time for caribou. If energy reserves cannot be maintained at a sufficient level during this critical period, caribou cows may abort their pregnancies. This can have serious repercussions on the population dynamics of the herd and therefore the ability of rural residents to be successful in their subsistence lifestyle.

The herd is one of the most important subsistence resources in the entire northwest portion of the state. Approximately 40 villages utilize the herd for subsistence purposes, with 15,000-20,000 animals being harvested annually.

The Nulato Hills offer considerable territory that has not been inventoried botanically. However, surveys covering a small portion of the Nulato Hills conducted during 1996, 1997, and 1998 by BLM and UAF Herbarium botanists discovered five plant species that are currently tracked by the ANHP as rare within the state. Three of these rare plants are listed as BLM-Alaska sensitive species (*Douglasia alaskana*, *Douglasia beringensis*, and *Potentilla stipularis*). The remaining two rare plant species (*Cardamine microphylla* ssp. *blaisdellii* and *Ranunculus auricomus*) will be considered for addition to the BLM-Alaska sensitive species list during future reviews of the list.

The proposed Nulato Hills ACEC also encompasses salmon habitat in the Inglutalik, Ungalik, and Shaktoolik watersheds.

#### (b) Inglutalik, Ungalik, and Shaktoolik watersheds

Salmon is a critical subsistence resource in the planning area. There are currently three designated ACECs focused on important salmon habitat in the Central Yukon RMP that are immediately adjacent to the planning area: Inglutalik ACEC, Ungalik ACEC, and Shaktoolik ACEC. The upper headwaters of these three watersheds are designated as ACECs in the adjacent planning area. The purpose of these designations is to protect salmon habitat. Since the majority of the salmon habitat in these three rivers is within the planning area, these areas will move forward for additional consideration as ACECs in the alternatives of this plan.

These rivers support populations of Dolly Varden, Arctic grayling, salmon (chum, coho, pink, and, to some degree, Chinook), and whitefish. They provide important habitat for both resident and anadromous fish. The fisheries in the Ungalik, Inglutalik, and Shaktoolik are among the richest in the region.

### (c) Kigluaik Mountains

The Kigluaik Mountains contain unique cirque lakes and associated fish populations, rare plants, sensitive plant communities, Eurasian bird species, and unique geological features. Populations of genetically isolated Kigluaik Arctic char have been identified in several lakes. Glacial Lake is an important spawning ground for red salmon. Two RNAs (Windy Cove and Mount Osborn) have been proposed within this area. Windy Cove includes one of the last segments of tidewater shoreline of the northern Seward Peninsula remaining in public ownership. The Kigluaik fault is the most active and most-recently active of the Seward Peninsula faults. Highly metamorphosed rocks reveal the deepest crustal rocks now exposed at surface in North America. Within the proposed Mount Osborn RNA are calcareous screes and limestone outcrops, providing alpine habitat for *Artemisia senjavinensis*, a rare plant endemic to the Seward Peninsula and a BLM sensitive species. Three other rare plants are found within the larger area of the proposed Kigluaik Mountains ACEC: *Beckwithia glacialis* ssp. *alaskensis* (also a BLM-Alaska sensitive species), plus *Ranunculus auricomus* and *Primula tschuktschorum*, both of which are tracked by the ANHP. The goldilocks buttercup (*Ranunuculus auricomus*) was discovered as new to North America in 1998

In addition to the important fish, botanical, and geological resources, the Kigluaik Mountains offer some of the most scenic vistas in the planning area. At 4,714 feet, Mount Osborn is the highest point on the Seward Peninsula. The whole range is full of precipitous peaks, picturesque cirques, and wild-running waterways. The Kigluaik Mountains are a storehouse of classic periglacial and glacially sculpted erosiional and depositional geomorphic features. This area is highly accessible to the communities of Nome and Teller, which raises the fragile and unique area's vulnerability to change.

### (d) Upper Kuzitrin River

The upper Kuzitrin River is an important wintering area for moose on the Seward Peninsula and is also frequently utilized by wintering caribou of the WACH. Moose and caribou are some of the most important subsistence resources on the Seward Peninsula. Winter in the subarctic is a nutritionally demanding time for ungulates. If energy reserves cannot be maintained at a sufficient level during this critical period, cows may abort their pregnancies. This can have serious repercussions on the population dynamics of moose and caribou and therefore the ability of rural residents to be successful in their subsistence lifestyle.

The upper Kuzitrin River provide important habitat for waterfowl. Based on ground brood counts between 1989 and 1993, the average number of duck broods per square kilometer in the upper Kuzitrin was 10.9. American wigeon, mallard, green-winged teal, northern shoveler, and northern pintail were the predominate dabbling ducks found. Greater scaup, oldsquaw, and black scoters were the most common diving ducks. Other species observed during the surveys included tundra swan, red-necked grebes, Arctic loons, common loons, yellow-billed loons, pacific loons, white-fronted geese, Canada geese, and sandhill cranes (Jandt and Morkill 1994, Anderson and Robinson 1991).

### (e) McCarthy's Marsh

McCarthy's Marsh a critical wintering area for moose on the Seward Peninsula and is also frequently utilized by wintering caribou of the WACH. Moose and caribou are some of the most important subsistence resources on the Seward Peninsula. Winter in the subarctic is a nutritionally demanding time for ungulates. If energy reserves cannot be maintained at a sufficient level during this critical period, cows may abort their pregnancies. This can have

serious repercussions on the population dynamics of moose and caribou and therefore the ability of rural residents to be successful in their subsistence lifestyle.

The marsh also supports a wide array of bird species during the short summer months. It provides important habitat for waterfowl. This includes the yellow-billed loon, a BLM sensitive species. Based on ground brood counts between 1989 and 1993, the average number of duck broods per square kilometer in McCarthy's Marsh was 9.7. American wigeon, mallard, green-winged teal, northern shoveler, and northern pintail were the predominate dabbling ducks found. Greater scaup, long-tailed duck (previously known as oldsquaw), and black scoters were the most common diving ducks. Other species observed during the surveys included tundra swan, red-necked grebes, Arctic loons, common loons, pacific loons, greater white-fronted geese, Canada geese, and sandhill cranes (Jandt and Morkill 1994, Anderson and Robinson 1991).

#### (f) WACH Insect Relief and Calving Grounds

The WACH critical insect relief habitat and calving grounds are regionally significant. The area has more than locally significant qualities which give it special worth and meaning. There is cause for concern due to the potential for future development in the area. The area is a critical insect relief zone for the WACH, one of the largest caribou herds on the continent and a very important subsistence resource in northwestern Alaska. This area has been utilized consistently by caribou since the WACH has been tracked by ADF&G.

Most of the calving area is located within the National Petroleum Reserve Alaska (NPR-A). The ACEC is adjacent to high quality coal reserves and there is potential for future development of infrastructure to support development of coal resources. Calving is when caribou are most sensitive to disturbance. Caribou are most prone to predation within the first month of life. Post-calving aggregation is also a demanding time for caribou. If energy reserves cannot be maintained at a sufficient level during this important period, caribou calves may suffer nutritionally and productivity of the herd may be affected. This can have serious repercussions on the population dynamics of the herd and therefore the ability of rural residents to be successful in their subsistence lifestyle. Caribou are plagued by numerous insect pests, such as warble flies, mosquitoes, and nose bots, during this period. They seek windy spots, ground devoid of vegetation, and snow fields to reduce intense insect harassment. In addition to caribou habitat, the ACEC potentially includes habitat for Kittlitz's murrelet, yellow-billed loon, and red knot which are all BLM sensitive species.

## b) RNAs

### *(1) Background*

According to 43 CFR Subpart 8223, a RNA is "an area that is established and maintained for the primary purpose of research and education." The land must have at least one of the following characteristics:

- A typical representation of a common plant or animal association,
- An unusual plant or animal association,
- A threatened or endangered plan or animal species,
- A typical representation of common geologic, soil, or water features, outstanding or unusual geologic oil, or water features, or
- The area must be of sufficient number and size to adequately provide for scientific study, research, and demonstration purposes.

Currently, there are no designated RNAs in the planning area. In 1985, four areas were investigated for their potential as Natural Area (RNA): 1) Clear Creek Hotsprings, 2) Camp Haven Gap, 3) Mount Osborn, and 4) Windy Cove. Consideration for designation was postponed until the BLM developed a new land use plan for the area.

### *(2) Nominated Areas*

During the public scoping process, the following areas were nominated for consideration as RNAs (Map 3-34). Two of these areas, Mount Osborn and Windy Cove, are within the Kigluaik Mountains, an area nominated for ACEC designation.

- Clear Creek Hotsprings – nominated by the Alaska Coalition
- Camp Haven Gap - nominated by the Alaska Coalition
- Mount Osborn – nominated by the Alaska Coalition
- Windy Cove – nominated by the Alaska Coalition

#### (a) Mount Osborn

It was determined that Mount Osborn meets the criteria of an RNA and should be considered for designation in alternatives in this draft RMP. Features of interest in Mount Osborn RNA include carbonate rock habitats that support rare plants, small glaciers and moranes, well developed periglacial features and classically sculpted glacial erosional and depositional geomorphic features, and exposed, highly metamorphosed rocks from deep in the earth's crust. One of the plant species of interest, *Artemisia senjavinensis* is a BLM sensitive species. The proposed RNA includes the core of the glaciated mountains, the summit of Mount Osborn and the glaciated Grand Central Valley. Garnet peridotite found on the surface of the RNA probably formed at more than 28 miles deep in the earth's crust. This may be the deepest crustal rocks now in surface exposure in North America. The boundary of the RNA was modified to include several lakes that support Kigluaik char and additional geologic features of interest. The Mount Osborn RNA is entirely encompassed by the proposed Kigluaik ACEC.

#### (b) Windy Cove

Windy Cove meets the criteria for designation. However, the area of most scientific interest is high priority Native selections and will likely not remain in public ownership. In addition, the area was not large enough to adequately provide for scientific study and research. For these reasons, it will not be considered for designation as a RNA. The upper portion of the proposed Windy Cove RNA is encompassed by the Kigluaik ACEC and the expanded Mount Osborn RNA which are considered for designation under alternatives of this plan.

#### (c) Clear Creek Hot Springs

It was determined that Clear Creek Hot Springs should not be considered for designation as an RNA. Clear Creek Hot springs meets the criteria for designation however, the parts of the nomination with the highest values (hot spring vents) will not remain in public ownership.

#### (d) Camp Haven Gap

It was determined that Camp Haven Gap should not be considered for designation as an RNA. It was determined that high priority state selections would limit the potential for future designation, and the values of the area were not unique enough to warrant RNA designation.

## 2. Iditarod National Historic Trail

The planning area has the only recognized National Historic Trail (NHT) in Alaska, the Iditarod which crosses the southern portion of the planning area between Unalakleet and Nome (Map 3-32). The Iditarod is used for casual recreational use, inter-village travel, and a variety of commercial events and group activities such as the Iditarod Sled Dog Race.

The Iditarod NHT was designated as such in 1978. It is a complex trail system stretching approximately 1,000 miles from Seward in the south to Nome on the Bering Sea. It crosses lands owned by numerous Native corporations, municipal governments, the State, and several Federal agencies.

The Iditarod NHT is managed under a comprehensive management plan prepared by the BLM, the Federal agency appointed as coordinator of the trail. The plan establishes guidelines to promote the preservation, use, and enjoyment of the trail. It also identifies all the trails and sites making up the historic trail system. Iditarod National Historic Trail Inc. is a non-profit, volunteer organization that provides guidance on several aspects of trail management including design of trail markers, cooperative agreements, and competitive events. The Iditarod Trail Blazers and other volunteers provide trail maintenance and construction assistance.

INSERT 11x17 MAP
**3_34_acec_nom**

# 3. Wild and Scenic Rivers

This document will provide the review of eligibility and suitability of rivers within the planning area as required by the Wild and Scenic Rivers Act and BLM planning guidance. This Existing Environment section will cover the legal requirements and review process, and list those rivers found legally eligible as potential additions to the National Wild and Scenic Rivers System. The decision on suitability, or which rivers should actually be recommended to congress for inclusion in the national system, will be one of the outcomes of the complete planning process.

## a) Laws, Regulations, and Policies

### (1) Laws and Policies

Congress has directed the Federal Government to consider potential additions to the National Wild and Scenic Rivers System during land use planning as described below.

#### (a) Policy Protecting Certain Rivers

Section 1(b) of the Wild and Scenic Rivers Act (WSRA) 16 U.S.C. §1271 et seq. (2001) states:
It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

#### (b) Direction to Evaluate Rivers While Planning

Section 5(d)(1) of the WSRA requires:
In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas, and all river basin and project plan reports submitted to the Congress shall consider and discuss any such potential. The Secretary of the Interior and the Secretary of Agriculture shall make specific studies and investigations to determine which additional wild, scenic and recreational river areas within the United States shall be evaluated in planning reports by all Federal agencies as potential alternative uses of the water and related land resources involved.

### (2) Regulations

Although the WSRA requires the secretaries of Agriculture and the Interior to develop regulations to implement the Act, only Agriculture has done so. That said, the requirements of the act are recognized in many parts of the CFR. A listing of the most important CFR citations for wild and scenic rivers flowing through BLM-managed lands follows:

- 43 CFR 8350, Subpart 8351 – Designated National Area
- 40 CFR 6.302 – Wetlands, floodplains, important farmlands, coastal zones
- 36 CFR 292.47 – Mining activities
- 43 CFR 8351.2-1-- Sec. 8351.2-1 Special rules
- 43 CFR 3400.2-- Sec. 3400.2 Lands subject to leasing
- 18 CFR 292.208-- Sec. 292.208 Special requirements for hydroelectric small power production

- 32 CFR 651-- Part 651—Environmental Analysis of Army Actions (AR 200-2)
- 30 CFR 761.11-- Sec. 761.11 Areas where surface coal mining operations are prohibited
- 43 CFR 36—Part 36 – Transportation and Utility Systems
- 43 CFR 3800—Part 3800 – Mining Claims Under the General Mining Laws
- 50 CFR 100—Part 100 – Subsistence Management Regulations For Public Lands in Alaska
- 43 CFR 3400—Part 3400 – Coal Management: General
- 43 CFR 8351.0-1-- Sec. 8351.0-1 Purpose
- 43 CFR 8351.0-2-- Sec. 8351.0-2 Objective
- 43 CFR 8351.0-3-- Sec. 8351.0-3 Authority
- 43 CFR 2568.100-- Sec. 2568.100 What is a CSU?
- 43 CFR 2547.6-- Sec. 2547.6 Lands not subject to disposal under this subpart
- 43 CFR 8360.0-3-- Sec. 8360.0-3 Authority
- 43 CFR 8340.0-3-- Sec. 8340.0-3 Authority
- 43 CFR 3809.415-- Sec. 3809.415 How do I prevent unnecessary or undue degradation while conducting operations on public lands?
- 43 CFR 3206.11-- Sec. 3206.11 What must BLM do before issuing my lease?
- 43 CFR 2710.0-8-- Sec. 2710.0-8 Lands subject to sale
- 43 CFR 3809.11-- Sec. 3809.11 When do I have to submit a plan of operations?
- 43 CFR 8360-- Subpart 8360--General

# b) Background

The Federal government has been directed by congress to identify and recommend worthy additions to the national wild and scenic rivers system during land use planning efforts, as described above. The task of making recommendations on the suitability or non-suitability of rivers as worthy additions to the national wild and scenic rivers system requires agreement on the meaning of several terms used throughout this EIS. The BLM has made every effort to remain consistent to the definitions supplied below.

## *(1) Definitions*

### (a) Eligibility

Eligibility is mentioned once in the WSRA (in Sec. 5(d)(1)) but is not defined there. Nevertheless, the term has become synonymous with an initial screening of potential rivers during a wild and scenic river study process (Diedrich and Thomas 1999, BLM 1993). In order to be eligible for designation as a component of the national wild and scenic rivers system, a river must be free-flowing and possess one or more outstandingly remarkable values (see below). An eligible river meets the bare minimum legal requirements for inclusion in the national system, but requires further scrutiny to determine if it is suitable as a worthy addition to the national system. Eligibility is, in legal terms, a determination made by the facts of the matter, and not a planning decision. (See the definition of suitability on page 3-243.)

### (b) Free-flowing

Section 16(b) of the WSRA contains a good definition of the term:
“Free-flowing,” as applied to any river or section of a river, means existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the

waterway. The existence, however, of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers system shall not automatically bar its consideration for such inclusion: Provided, That this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the national wild and scenic rivers system.

At this writing, all the rivers in the planning area are free-flowing.

### (c) Outstandingly Remarkable Values

An *outstandingly remarkable value* (ORV) must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. Such a value would be one that is a conspicuous example from among a number of similar values that are themselves uncommon or extraordinary. Only one outstandingly remarkable value is needed for eligibility. For the purposes of this report the BLM considered both a regional scale (the planning area) and the national scale.

While the spectrum of resources that may be considered is broad, outstandingly remarkable values are directly river-related. That is, they should 1) be located in the river or on its immediate shorelands (generally within one-fourth mile on either side of the river), 2) contribute substantially to the functioning of the river ecosystem, and/or 3) owe their location or existence to the presence of the river.

### (d) Suitability

One of the outcomes of this EIS will be decisions on the suitability or non-suitability of the rivers within the planning as worthy additions to the national wild and scenic rivers system. In contrast to eligibility, which is based on a factual description of the existing situation, suitability is a decision based on weighing various elements through the planning process. Details on the process used to make suitability decisions are given below. Rivers that are found suitable through the planning process should be recommended for designation by congress. During consideration by congress, rivers determined to be suitable would be managed to protect free-flow, water quality, and identified outstandingly remarkable values. We will examine the potential effects of congressional designation of several rivers as we assess the impacts of the range of alternatives in this document.

## *(2) Key Elements of Suitability Determinations*

The decision on suitability will be made after answering the following questions:

- Should the river’s free-flowing character, water quality, and ORVs be protected, or are one or more other uses important enough to warrant doing otherwise?
- Would the river’s free-flowing character, water quality, and ORVs be protected through designation?
- Would designation the best method for protecting the river corridor? The benefits and impacts of WSR designation must be evaluated, and alternative protection methods considered.
- Is there a demonstrated commitment to protect the river by any non-Federal entities who may be partially responsible for implementing protective management?

### *(3) Factors Considered in Suitability Determinations*

The WSRA lists several factors that must be addressed in reports on suitability or non-suitability:

- Current status of land ownership and use in the area. This factor is covered in Chapter I, Planning Area section, of this EIS.
- Reasonably foreseeable potential uses of the land and water which would be enhanced, foreclosed, or curtailed if the area were included in the national wild and scenic rivers system. This factor is covered in Chapter II, Resource Uses section, and Chapter IV.
- Federal, State, local, Tribal, public, or other interests in designation or non-designation. This factor is covered in this section and in Chapters II, IV, and V.
- The Federal agency that would administer the river, if it were designated. For the purposes of this EIS, it is assumed that BLM would be the federal agency administering any designated rivers.
- The extent to which the costs of river management would be shared by State and local agencies, if it were to be designated. For the purposes of this EIS, it is assumed that the Federal government would bear all costs of river management for any designated rivers.
- The ability of the BLM to manage and/or protect the river as a wild and scenic river area. This factor is discussed in Chapters II and IV.
- Historical or existing rights which could be adversely affected by designation. This factor is covered in Chapters II, III, and IV.
- The estimated cost to the United States, if the river were to be designated. This factor is covered in Chapters II and IV.

## c) Previous Study of the Squirrel River

ANILCA amended the WSRA to designate the Squirrel River for study as a potential addition to the national wild and scenic rivers system. More specifically, this amendment directs the Secretary of the Interior to “study and submit to the President a report on the suitability of nonsuitability [of the Squirrel River] for addition to the national wild and scenic rivers system.” BLM has completed the study and forwarded a report to the President that found the Squirrel River to be non-suitable for addition to the national system. The Squirrel River will not receive further consideration as a potential addition to the national system in this planning effort.

Since all the rivers in the planning area are free flowing, identifying eligible rivers according to the WSRA rest on the existence of outstandingly remarkable values. Throughout the scoping process, in public meetings, and in planning team deliberations, the planning team identified the presence of outstandingly remarkable values. Previous planning and inventory efforts were reviewed. Certain rivers were mentioned in public comments as having outstandingly remarkable values including: the Kivalina, Wulik, Tubutulik, Inglutalik, Shaktoolik, Ungalik, Koyuk, Agiapuk, and Fish rivers. This area of Alaska has many rivers that, taken in a national context have outstanding and culturally important fisheries resources. It may seem repetitive to list 11 streams, all with outstanding fisheries values, but in the context of the entire coast of the United States, these streams to seem outstanding in this regard. The rivers determined to be eligible through the scoping process are listed, along with their outstandingly remarkable values, in Table 3-36 and displayed on Map 3-35.

**Table 3-36. Eligible Rivers within the Planning Area**

| River Name | Outstandingly Remarkable Value(s) |
|---|---|
| Kivalina River | Fish habitat, water quality for subsistence production and domestic use |
| Inglutalik River | Fish habitat, scenery, primitive recreation |
| Fish River (McCarthy's Marsh) | Fish habitat, moose habitat, caribou habitat, waterfowl habitat |
| Upper Buckland and Fish River | Fish habitat |
| Ungalik River | Fish habitat, scenery, primitive recreation |
| Shatoolik River | Fish habitat, scenery, primitive recreation |
| Koyuk/Peace/East Fork | River recreation, fish habitat |
| Tubutulik River | Fish habitat |
| Agiapuk | Fish habitat |
| Kiliovilik | Fish habitat |
| Nilik/Ipewik/Kukpik | Fish habitat |

INSERT 11x17 MAP
**3_35_wsr_inv**

# E. Social and Economic

## *1. Public Safety*

### a) Abandoned Mine Lands

The BLM's Abandoned Mine Lands (AML) program is a relatively new program that was designed to address water quality issues originating from the vast numbers of abandoned mine sites through a large and programmatic approach incorporating multiple BLM programs to the one specific issue. The program will be phased out in the near future as the numbers of adversely impacted watersheds by past mining activities are cleaned up throughout America. Old mine workings are found throughout Alaska on lands administered by the BLM, USDA Forest Service, FWS, NPS, the State, Native Village and Regional corporations, and private lands patented under the 1872 Mining Law.

These mineral rich mining districts had no environmental protection from early mining practices. Federal land management agencies had no requirements for performing reclamation at the time when most of the mines were abandoned on public lands. Their closures were often inadequate or non-existent. Low mineral prices and exhausted lodes have left many abandoned mine adits, shafts, and pits.

#### *(1) Goals*

The BLM's Strategic Plan calls for remediating 375 AML sites nationwide. The BLM's 10-year goal (1996-2006) is to eventually evaluate every known AML site on public lands and address all environmental and physical safety hazards present. BLM-Alaska will continue to assess and characterize all known AML sites on their existing inventory as well as sites that were missed during the initial inventory.

The BLM's priority setting process for reclamation of environmental contaminated sites is based on risk assessments that address threats to human health and the environment. Abandoned mine land sites that impact water quality are usually a greater concern and receive a higher priority for reclamation than sites that do not impact water quality. The Hazardous Materials Management Program addresses issues of environmental quality degradation due to chemical, biological and/or radiological pollution, and/or contamination in coordination with other cleanup activities located on the abandoned mine, such as the reclamation of mine tailings and river geomorphology by the AML program.

The BLM's priority setting process for addressing physical safety threats to the public are AML sites where: 1) a death or injury has occurred, and the site has not already been addressed, and 2) where the mine is situated on or in immediate proximity to developed recreation sites and areas with high visitor use.

BLM policy requires managers to exercise discretion and consider potential impacts to physical safety and environmental risks at AML sites in future recreation management area designations, land use planning assessments, and all other applicable use authorizations.

### *(2) Hazards/Risks*

There may be some hazards and risks to human health and the environment at abandoned mine sites. Some of the threats to human health and the environment are a result of heavy metal contamination, metal contaminated tailings impoundments, stored chemicals and gases, leaking containers, equipment, old buildings, abandoned explosives, petroleum, and improper managed waste(s). An alteration or loss of natural habitat for many native wildlife species can occur because of changes in vegetation or aquatic habitat as a result of soil loss or changes in the chemical composition of soils near AML sites. Abandoned mines may also impact surface and ground water flows and water quality. Impacts to water quality are generally the result of contaminated sediments or metal salts that can affect human health, fisheries, wildlife, and vegetation. Air pollution from contaminated dust can occur on tailings impoundments and waste rock piles near abandoned mill sites. There may also be releases or potential releases of hazardous substances from waste materials and acid drainage beyond AML sites.

Physical safety risks associated with abandoned mines are open features including adits, shafts, pits, and high-walls, and unstable and decayed support structures in mines and buildings.

### *(3) Reclamation Activities*

Because of the multiple hazards, risks and potential impacts to human health and safety and the environment through multiple mediums (e.g., soils, surface waters, wildlife), the program coordinates with other programs that are specialized in a certain field (i.e., the Hazardous Materials Management Program addresses issues of chemical, biological, and/or radiological pollution and contamination; the Fisheries program addresses issues of impacts on fisheries habitat; and the Cultural and Historical program addresses issues of cultural and historical importance).

### *(4) Current Activities in the Planning Area*

Two AML sites were cleaned up in the planning area through the AML program: an abandoned mine on the Tubutulik River near Elim, and the Quartz/Dahl Creek site on the Nome-Taylor Highway. Remediation of both sites has been completed. The Quartz/Dahl site was conveyed to the State. Current status of the Tubutulik site is unknown.

## b) Hazardous Materials Management

The Hazardous Materials Management Program is responsible for coordinating efforts addressing hazard(s) management and resource restoration on BLM-managed lands. These efforts are executed through the balance and guidance of numerous laws, regulations, and policies related to pollution activities, contaminated sites, and the environments affected by pollution and/or contamination issues such as the natural environment and human health and safety. The program typically takes into consideration multiple fields in conducting remediation and restoration efforts, such as scientific data (physical, biological, and chemical), legal, economic, political, historical, cultural, and personal perceptions (personal/cultural/social benefits from a site/area).

The goals of the BLM-Alaska Hazardous Materials Management program are:

- To protect public health and safety and environmental resources by minimizing environmental contamination from chemical, biological, and radiological sources on public lands and BLM owned or operated facilities;
- To comply with Federal and State oil and hazardous materials management laws and regulations;
- To maintain the health of ecosystems through assessment, cleanup, and restoration of contaminated sites;
- To manage oil and hazardous materials related risks, costs, and liabilities; and
- To integrate environmental protection and compliance with all environmental statutes into all BLM activities.

### *(1) Potential Sources of Hazardous Materials*

There are currently 14 known contaminated sites in the planning area administered by the BLM's Hazardous Materials Management Program (Map 3-36). Most sites are or were at one time involved and/or connected to past and present mining activities, while the remaining sites are associated with various activities (Federal, military, State, and/or industry) that took place in the past. Due to budget constraints and BLM priorities, remediation efforts of numerous sites have not been started. A few sites, Feather River Dump and Ungalik in particular, are identified to have site characterization conducted in the near future.

Remediation efforts in the planning area include the completion of the Dahl/Quartz Creek site for conveyance to the State of Alaska (August 2004) and the removal of pollution sources at the Ungalik site.

It is anticipated that additional sites will be identified, followed by remediation efforts. Additionally, it is anticipated that numerous potentially contaminated sites have already been conveyed to the State, regional Native corporations, village corporations, and/or tribal governments.

There are potential sources of pollution that are outside the boundaries of BLM-managed lands but may affect BLM-managed resources. Potential sources include abandoned and active military facilities and operations, mining activities and sites (abandoned and active), oil and gas activities and sites, illegal activities, and atmospheric deposition. Because the BLM does not have jurisdiction over resources and/or activities outside its management, the BLM is involved in coordination efforts with other institutions to minimize potential adverse effects to BLM-managed resources. If a potential pollution source does affect BLM-managed resources, the BLM has authority to take actions against responsible parties in order to remedy adversely affected resources. For further information pertaining to responsible parties, see the discussion on potential responsible parties (PRPs) on page 3-254. The hazardous materials that may be encountered as a result of various activities are listed in the following table.

**Table 3-37. Activities and Associated Hazardous Materials**

| Activity | Hazardous Materials |
|---|---|
| Mining (abandoned and active) | Chemicals associated with processing ore or used in laboratories (e.g., cyanide)<br>Explosives such as dynamite, ammonium nitrate, caps, and boosters<br>Heavy metals (ore, product, and waste)<br>Asbestos<br>Petroleum (crude, products, and wastes)<br>Contaminated environmental media |
| Military operations and facilities (past and present) | Unexploded ordinances (UXOs)<br>Aircraft wreckage<br>Formally used Defense sites (FUDS)<br>Other military sites not identified as FUDS<br>Contaminated environmental media |
| Illegal activities (past and present) | Unauthorized landfills<br>Dumping of barrels or other containers with oil and hazardous substances on public land<br>Drug labs<br>Contaminated environmental media |
| Oil and gas activities (past and present) | Hydrogen sulfide gas<br>Oil spills<br>Other chemical spills<br>Contaminated environmental media |
| Facilities on public land either Federal or private (under a right-of-way) (past and present) | Leaky storage tanks (above ground and underground)<br>Asbestos<br>Contaminated environmental media |
| Facilities off public land (past and present) | Same examples as for facilities on public land above |
| Atmospheric deposition | Heavy metals (e.g., mercury, selenium, lead, zinc)<br>Contaminated environmental media |

### *(2) Potential Effects and Risks to Environments*

Potential effects and risks to environments due to polluting activities and contaminated sites/areas are widespread and touch nearly every program within the BLM. In an attempt to simplify the identification of potentially affected environments two types of effects are identified: environmental media and human activities. Environmental media is a generic term given to cover all basic environmental elements such as air, surface water, subsurface water (groundwater), and surface soils (topsoil). Generally, if one environmental medium is affected through pollution activities and becomes contaminated, another environmental medium is at risk of being contaminated as well. Human activities are any and all possible activities a “person” may desire to conduct on public lands within the planning area. Human activities need not be economically quantifiable to be identified as an activity that takes place on public lands.

### *(3) Environmental Media*

Due to pollution activities and the result of contaminated sites and/or areas, a variety of environmental media are at risk and potentially affected in the present and future for a variety of reasons. The primary effect pollution and contamination has on environmental media is the

degradation of environmental quality. A summary of potential affects and risks to environmental media is listed in Table 3-38.

If an oil spill occurred on the ground near a river, for example, the surface soils would be affected. In a matter of time the subsurface soils and surface waters could be affected. Once those media are affected, the subsurface waters can become affected. Additionally, vegetation and animals that come into contact with the ground surface and/or the surface waters are also at risk of being affected.

For identification of the current conditions and trends of environmental media in the planning area, see the applicable sections within this chapter.

**Table 3-38. Potential Effects and Risks to Environmental Media**

| **If this medium is contaminated ...** | **...then these marked media are at risk of being affected.** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Surface Soils** | **Sub-surface Soils** | **Surface Waters** | **Sub-surface Waters** | **Vegetation** | **Air** | **Wildlife** | **Fisheries** | **Avian Species** | **Marine Mammals** |
| **Surface Soils** | X | X | X | X | X | X | X | X | X | X |
| **Subsurface Soils** | X | X | X | X | X | | X | X | X | X |
| **Surface Waters** | X | X | X | X | X | X | X | X | X | X |
| **Subsurface Waters** | | X | X | X | X | | X | X | X | X |
| **Vegetation** | X | | X | X | | | X | X | X | X |
| **Air** | X | | X | | X | | X | X | X | X |

## *(4) Human Activities*

Due to pollution activities and the result of contaminated sites and/or areas, a variety of human activities are potentially affected and placed at risk in the present and the future for a variety of reasons. Table 3-39 summarizes potentially affected human activities from pollution activities and/or contaminated sites/areas. The primary effect pollution and contamination may have on human activities on public lands is the restriction of access and use of any type that may potentially affect the contaminated site (and potentially affect human health and safety) until the site/area is remediated and the BLM determines that a “No Further Action is Needed” action is appropriate.

For identification of the current conditions and trends of human activities in the planning area, refer to the other program sections within this chapter.

**Table 3-39. Potential Effects and Risks to Human Activities**

| Activity | Potential Risks |
|---|---|
| Subsistence | Human health and safety<br>Alteration of traditional activities<br>Environmental injustice(s) |
| Cultural landscapes/places | Human health and safety<br>Alteration of traditional activities<br>Environmental injustice(s) |
| Permitted commercial activities | Human health and safety<br>Economic loss(es) |
| Private/personal activities | Human health and safety<br>Economic loss(es)<br>Alteration of personal choice(s)<br>Environmental injustice(s) |
| Recreation | Human health and safety<br>Non-economic loss(es)<br>Alteration of personal choice(s)<br>Environmental injustice(s) |
| Research | Human health and safety<br>Economic loss(es)<br>Information loss(es) |
| Land Conveyance | Not meeting 2009 deadline<br>Restricting access and use to contaminated sites/areas |
| Fire Protection | Human health and safety<br>Economic loss(es) |

Any person who qualifies as a PRP may be held liable for some portion of or all of the costs incurred by the BLM, the DOI, or other regulatory entities for cleaning up a hazmat site. These costs include all monies spent for site investigations, sampling, engineering evaluations, pilot studies, alternative remedy analyses, contractor costs, labor costs, enforcement costs, and other activities (not inconsistent with the process outlined in the National Contingency Plan) undertaken to address the release site.

The BLM's policy is to identify PRPs who are or may be liable for hazardous substance releases to the environment affecting BLM-managed resources and pursue all viable parties for the assessment, remediation, and reclamation of the impacted area(s) and resources. If the PRP does not respond in a reasonable amount of time and/or with reasonable effort, the BLM may then clean up the release and pursue cost recovery. If there is no viable PRP present, the BLM will prioritize the site and fund the removal/remediation to mitigate the threat to human health and safety and the environment.

### *(5) Natural Resource Damage Assessment and Restoration*

The objective of the DOI's Natural Resource Damage Assessment and Restoration Program is to restore natural resources injured as the result of oil spills or hazardous substance releases into the environment. In partnership with other affected State, Tribal, and Federal trustee agencies, damage assessments provide the basis for determining the restoration needs that address the public's loss and use of these resources.

The program assesses the damages and injuries to natural resources entrusted to the DOI and negotiates legal settlements or takes other legal actions against the responsible parties for the spill or release. Funds from these settlements are then used to restore the injured resources at no expense to the taxpayer. Settlements often include the recovery of the costs incurred in assessing the damages. These funds are then used to fund further damage assessments.

INSERT 11x17 MAP
**3_36_hazmat**

# 2. Social and Economic Conditions

This section summarizes demographic and economic trend information, and describes key industries in the planning area that could be affected by BLM management actions. Local industries most likely affected by BLM land management policies and programs are travel, tourism and recreation, reindeer grazing, and mineral exploration and mining.

## a) Social and Economic

### (1) Regional Overview

The planning area includes the Northwest Arctic Borough, the Nome Census Area, and the far western portion of the North Slope Borough. Nome and Kotzebue have the largest population and are "gateway communities," trade and transportation centers for the region. Point Hope (population 757) is the second largest city in the North Slope Borough and the fourth largest town in the planning area. It is also a "community of place," primarily as a subsistence whaling center, formerly a nineteenth century commercial whaling center. Twenty-two other villages are within the planning area. These villages range in population from 109 (Kobuk) to 772 (Selawik). Solomon is also included as it is an ANCSA Village Corporation, although its 2000 population was four individuals, and detailed census information is unavailable. All of the villages in the planning area are dependent upon resources for subsistence. Subsistence is probably the "interest" of most universal significance in the planning area.

Nome and Kotzebue have commercial airline service connecting cities outside the region. Regional air service provides the only year-round access to villages in the planning area. Although there are about 200 miles of roads and old rail beds in the Nome area, only Nome and Teller share access along a system built originally to connect mining sites. Many of the villages and towns are incorporated and collect sales tax ranging from 1 percent in White Mountain to 6 percent in Kotzebue. Nome and Kotzebue also collect hotel bed tax and liquor tax, and Nome collects property tax.

Northwest Arctic Native Association (NANA), Bering Straight Native Corporation, and Arctic Slope Regional Corporation were formed under ANCSA as were Native village corporations within the planning area.

The planning area can be characterized as a mixed subsistence-market economy. Villages such as Selawik and Kobuk fit this description closely, while Nome and Kotzebue have become closer to the classic industrial-capitalist character.

Recent change agents in the planning area include the opening and operation of the Red Dog Mine, the passage of ANCSA, and the passage of ANILCA, including creation of four conservation units in the area: Noatak National Preserve, Kobuk Valley National Park, Cape Krusenstern National Monument, and Selawik NWR. These events directly resulted in employment and income in the planning area. With the growth of major population centers (southcentral Alaska and Fairbanks), visitation and use of area resources has increased dramatically in the last 20-30 years. Population in the area has grown over the last three decades, although migration from the area has also increased.

Increasing incomes and desire for basic amenities often not available in Bush villages inspire out-migration. In the Nome Census Area, for example, almost one-third of all housing lacked complete plumbing, and almost one-third lacked complete kitchen facilities.

Energy is very expensive in the region. Market basket surveys conducted by the UAF Cooperative Extension Service in 2004 reported Nome area electricity 72 percent more expensive than Anchorage, and 140 percent higher than the United States average; heating oil 41 percent higher than Anchorage; unleaded gasoline 64 percent higher than Anchorage; and propane 104 percent higher than Anchorage (UAF 2005a). Census 2000 reported that almost 51 percent of workers in the Northwest Arctic Borough walked to work, and almost 23 percent used "other means," referring to personal modes of transportation other than motor vehicles or public transportation. Diesel and a small amount of wind generation provide electricity in local areas. Similarly, food costs are much higher in the planning area than urban centers in Alaska. The market basket for a family of four in Nome cost 2.2 times that of Anchorage and 1.4 times that same basket in Fairbanks in December 2004.

Data used in this analysis are from the Alaska Department of Labor and Workforce Development, the U.S. Census Bureau, and the Sonoran Institute's Economic Profile System.

### *(2) Community Profiles*

Community profiles for all villages, towns, and cities in the State, in both summary and detailed report forms, are available at the Alaska Department of Commerce and Community Development, Community Database Online at http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.htm. More detailed information on planning area communities can be found at this site.

### *(3) Demographics*

The population of the Northwest Arctic Borough, the Nome Census Area, and the communities of Point Lay and Point Hope (within the North Slope Borough) totals 17,686 (ADLWD 2004). According to the Alaska Department of Labor and Workforce Development, the population of the northern region encompassing the two boroughs and one census area is approximately 75 percent Alaska Native, primarily indigenous Iñupiat and Yup'ik people (Fried and Windisch-Cole 2005). In comparison, Alaska Natives comprised 16 percent of the state's population, which is a larger percentage of Native Americans than in any other state. The balance of the race distribution in the area and the state is primarily white, comprising as much as 70 percent of the state population. Although the Alaska Native population has doubled in the last 30 years, the population growth in the northern region communities has slowed to about 1.5 percent per year in the 1990s. Table 3-40, Table 3-41, and Table 3-42 show historic population for communities and boroughs in the planning area.

Alaska Natives are migrating to urban population centers including the Matanuska-Susitna Borough and Anchorage. The growth rate of the Native population in the Fairbanks North Star Borough is relatively low at 7.2 percent for the decade, which is half the growth rate for the state. Table 3-40 below displays the growth of the Alaska Native population for the state and selected communities.

Overall, the population growth in the three boroughs/census areas touching the planning area is very similar to the population growth rate for the state, though it is far below the population

growth rate of southcentral Alaska. Most interesting, the northern region's (comprised of the three north-northwest boroughs and the Nome Census Area in the state) median age was 25.5 years, nearly 8 years younger than the state median of 33 years (Fried and Windisch-Cole 2005).

Out-migration is evident with 6.6 to 8.7 persons per year per 1,000 population leaving the Northwest Arctic Borough and the Nome Census Area during 1990-2003. This is similar to the out-migration of the Fairbanks North Star Borough (-11.5/1,000/year), and similar to most of rural Alaska. Net positive migration was reported in Juneau, Anchorage, the Kenai Peninsula, and the Matanuska-Susitna Borough (with the highest rates at 25.5/1,000/year) during the same reporting period (ADCCED 2005).

**Table 3-40. Growth of Alaska Native Population**

| Location | Population by Year | | Percent growth |
|---|---|---|---|
| | 1990 | 2000 | |
| Alaska | 85,698 | 98,043 | 14.4 |
| Anchorage | 14,569 | 18,941 | 30.0 |
| Fairbanks | 5,330 | 5,714 | 7.2 |
| Matanuska-Susitna Valley | 1,939 | 3,264 | 68.3 |
| Nome Census Area | 6,148 | 6,915 | 12.5 |
| North Slope Borough | 4,336 | 5,050 | 16.5 |
| Northwest Arctic Borough | 5,209 | 5,944 | 14.1 |

Source: U.S. Census Bureau, Census 1999, 2000.

**Table 3-41. Population per Community, Historic U.S. Census Data**

| Community | Population by Year | | | | |
|---|---|---|---|---|---|
| | 1960 | 1970 | 1980 | 1990 | 2000 |
| Ambler | 70 | 169 | 192 | 311 | 309 |
| Brevig Mission | 77 | 123 | 138 | 198 | 276 |
| Buckland | 87 | 104 | 177 | 318 | 406 |
| Council | 0 | 35 | 19 | 8 | 0 |
| Deering | 95 | 85 | 150 | 157 | 136 |
| Elim | 145 | 174 | 211 | 264 | 313 |
| Golovin | 59 | 117 | 87 | 127 | 144 |
| Kiana | 253 | 278 | 345 | 385 | 388 |
| Kivalina | 142 | 188 | 241 | 317 | 377 |
| Kobuk | 62 | 54 | 54 | 69 | 109 |
| Kotzebue | 2,054 | 1,696 | 1,290 | 2,751 | 3,082 |
| Koyuk | 129 | 122 | 188 | 231 | 297 |
| Noatak | 275 | 293 | 273 | 333 | 428 |
| Nome | 2,316 | 2,488 | 2,544 | 3,500 | 3,505 |
| Noorvik | 384 | 462 | 492 | 531 | 634 |
| Point Hope | 324 | 386 | 464 | 639 | 757 |
| Point Lay | 0 | 0 | 68 | 139 | 247 |
| Selawik | 0 | 0 | 0 | 596 | 772 |
| Shaktoolik | 348 | 429 | 535 | 178 | 230 |
| Shishmaref | 187 | 151 | 164 | 456 | 562 |
| Shungnak | 135 | 165 | 202 | 223 | 256 |

| Community | Population by Year | | | | |
|---|---|---|---|---|---|
| | 1960 | 1970 | 1980 | 1990 | 2000 |
| Solomon | 0 | 0 | 4 | 6 | 4 |
| Teller | 217 | 220 | 212 | 151 | 268 |
| Wales | 128 | 131 | 133 | 161 | 152 |
| White Mountain | 151 | 87 | 125 | 180 | 203 |

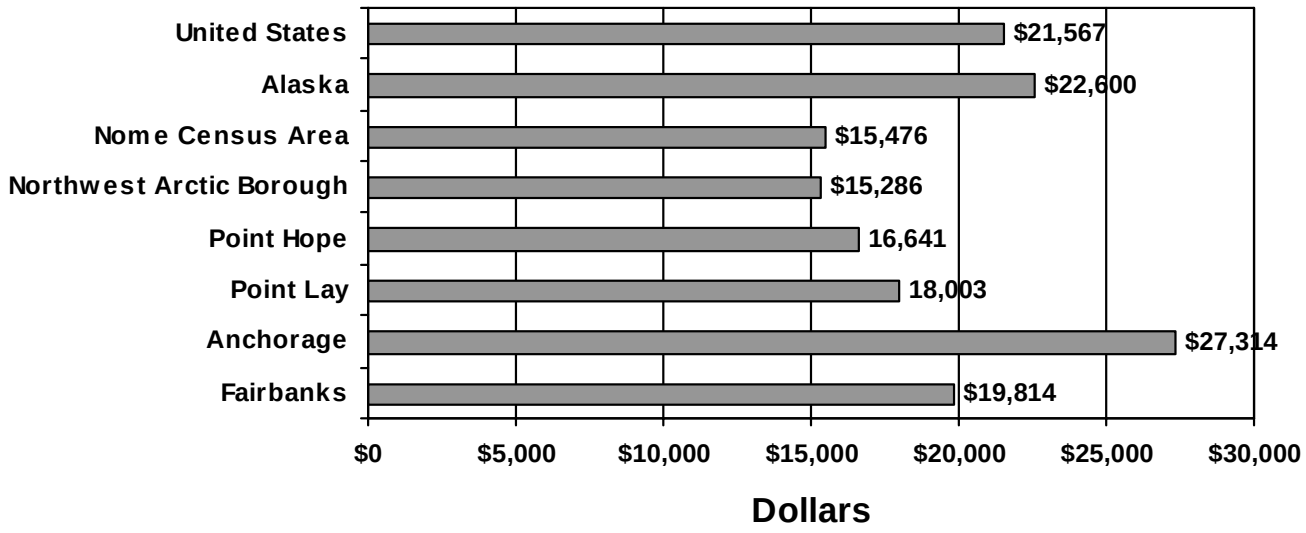
Source: Alaska Department of Commerce, Community, and Economic Development.

**Table 3-42. Population of Selected Boroughs**

| Community/Borough | Population by Year | | | | |
|---|---|---|---|---|---|
| | 1960 | 1970 | 1980 | 1990 | 2000 |
| Fairbanks North Star Borough | 43,412 | 45,864 | 53,983 | 77,720 | 82,840 |
| Anchorage Municipality/Borough | 82,833 | 126,385 | 174,431 | 226,338 | 260,283 |
| Northwest Arctic Borough | 3,560 | 4,434 | 4,831 | 6,113 | 7,208 |
| North Slope Borough | 2,133 | 2,663 | 4,199 | 5,979 | 7,385 |

Source: Alaska Department of Commerce, Community, and Economic Development.

**Figure 3-8. Comparison of Per Capita Income (2000)**




Source: U.S. Census Bureau, Census 2000.

**Table 3-43. Employment by Sector**

| Employment by Sector | Percentage of Total Employment by Area | | | | |
|---|---|---|---|---|---|
| | Northwest Arctic Borough | Nome Census Area | Point Hope | Point Lay | Alaska |
| Agriculture, forestry, fishing, hunting, mining | 14.3 | 1.5 | 3.0 | 7.3 | 4.9 |
| Construction | 4.5 | 3.0 | 9.7 | 24.0 | 7.3 |
| Manufacturing | 0.2 | 0.9 | 0 | 0 | 3.3 |
| Wholesale trade | 0.3 | 0.1 | 0 | 4.2 | 2.6 |
| Retail trade | 6.8 | 9.6 | 7.2 | 5.2 | 11.6 |
| Transportation, warehousing and utilities | 11.1 | 10.3 | 12.2 | 11.5 | 8.9 |
| Information | 1.6 | 2.3 | 0 | 0 | 2.7 |
| Finance, insurance, real estate, rental and leasing | 3.0 | 2.3 | 0 | 0 | 4.6 |
| Professional scientific, management, administrative and waste management | 1.7 | 1.8 | 0.4 | 3.1 | 7.6 |
| Education, health and social services | 33.4 | 38.1 | 36.3 | 25.0 | 21.7 |
| Arts, entertainment, recreation, accommodation and food services | 3.3 | 7.9 | 5.1 | 0 | 8.6 |
| Other services | 7.5 | 5.8 | 2.5 | 0 | 5.6 |
| Public administration | 12.4 | 16.4 | 23.6 | 19.8 | 10.7 |

Source: U.S. Census Bureau, Census 2000.

### *(4) Employment and Income*

As elsewhere in rural Alaska, public employment is very important to the economy of the planning area. The largest employers in the region are the Northwest Borough School District, Bering Strait School District, and Borough government and school districts in Point Lay and Point Hope.

The Red Dog Mine run by Teck Cominco Alaska is the largest private source of employment in the planning area and the third largest employer in the Northwest Arctic Borough. Teck Cominco Alaska provided 412 direct jobs to employees and contractors in 2003. This is slightly over 14 percent of all wage and salary employment, and 22 percent of non-government employment in the Borough. Employees of Teck Cominco Alaska live in 11 villages in the planning area, as well as in various locations outside the planning area. Over 50 percent of mine workers are NANA shareholders. Those directly employed by Teck Cominco Alaska receive free transportation to the job site from their residence within the state. As a result, only about 140 employed NANA shareholders live in the planning area. The mine operation also resulted in the Borough's largest source of revenue through Payments in Lieu of Taxes of $5.9 million in 2003 (Schaffer 2005).

Free range reindeer management is an industry that has become unique to the Seward Peninsula. Although reindeer were introduced in several Alaskan locations under the impetus of Sheldon Jackson in the 1890s, the only currently active herding occurs within the planning area. In 1996, the UAF Agriculture and Forestry Experimentation Station estimated that 14 herds grossed $1.1 million in income in 1996; however, BLM data indicate that the number of herders and size of herds has dropped since that time. There were a total of approximately 7,500

reindeer corralled by the only five active herders in 2004. As free range grazers, the reindeer move throughout the intermingled State, private, and various Federal agency lands. This makes it difficult to determine the exact income derived from grazing on BLM-managed lands. The BLM does not charge a fee for the right to graze.

ANCSA corporations, subsidiaries, and non-profits, and various tribal organizations have invested in services and provide employment for local residents and shareholders. The Arctic Slope Regional Corporation provides diverse employment including oil field services and construction. The Arctic Slope Native Association provides health service, social services, and hospital management. Ilisagvik College is a independent non-profit foundation. Maniilaq Association is a regional non-profit organization providing health, social services, public assistance, training, and a 25-bed hospital. Kawerak provides social and educational services for Alaska Natives, and is the third largest employer in the Nome area with 217 employees. Maniilaq Association is the second largest employer in the Northwest Arctic Borough. Norton Sound Health Corporation is a non-profit tribal health consortium of 20 Alaska Native communities employing over 400 people.

The Nome area benefits from a small but viable commercial fishery targeting salmon, halibut, crab, and herring. Although providing only a very small portion of fish harvest value in the state of Alaska, it provided $828,498 in 2003. Independent placer mines employ small numbers in the area. However, Nova Gold has identified two deposits estimated to hold one million ounces of gold. Neither of these deposits is located on BLM-managed lands. Production may begin in 2006.

Kikiktagruk Iñupiat Corporation (Kotzebue's village corporation) is a large employer in the visitor industry. NANA Management Service operates Nullaguik Hotel and Tour Arctic Corporation. NANA also operates hotels in Anchorage and Fairbanks.

Non-resident employment is similar to that in other areas of the state except in the North Slope Borough, where the percentage of non-local and non-Alaskan residents is very high. Private sector non-resident employment ranges from a low of 11 percent in Nome, to 13 percent in the Northwest Arctic Borough, to 28 percent in the North Slope Borough. The North Slope Borough workforce is comprised primarily of oil field-related jobs. Non-local Alaska residents also comprise a significant portion of the workforce in the planning area: only 10 percent in the Nome area, but 22 percent in Northwest Arctic Borough, and 58 percent in the North Slope Borough (Hadland and Wink 2005).

Unemployment in the planning area is considerably higher than in urban centers in Alaska and higher than the state average. According to State of Alaska data for 2003, unemployment ranged from a low of 15.2 percent in the Nome Census Area to 23 percent in Northwest Arctic Borough, while the state average was 8 percent (Fried and Windisch-Cole 2005). According to Economic Profile System data, there is no significant seasonal fluctuation in the rate of unemployment (Sonoran Institute 2005).

Labor force participation rates are low as is typical in Bush Alaska. Census data shows that White Mountain has the lowest participation rate in the planning area, with over 60 percent of the population not in the labor force in 2000. This percentage underscores the relative scarcity of jobs and emphasizes the role and importance of subsistence activities.

The educational attainment curve lags in Bush villages. Over 60 percent of residents of Alaska have some college, while in the planning area between 60 and 70 percent of residents

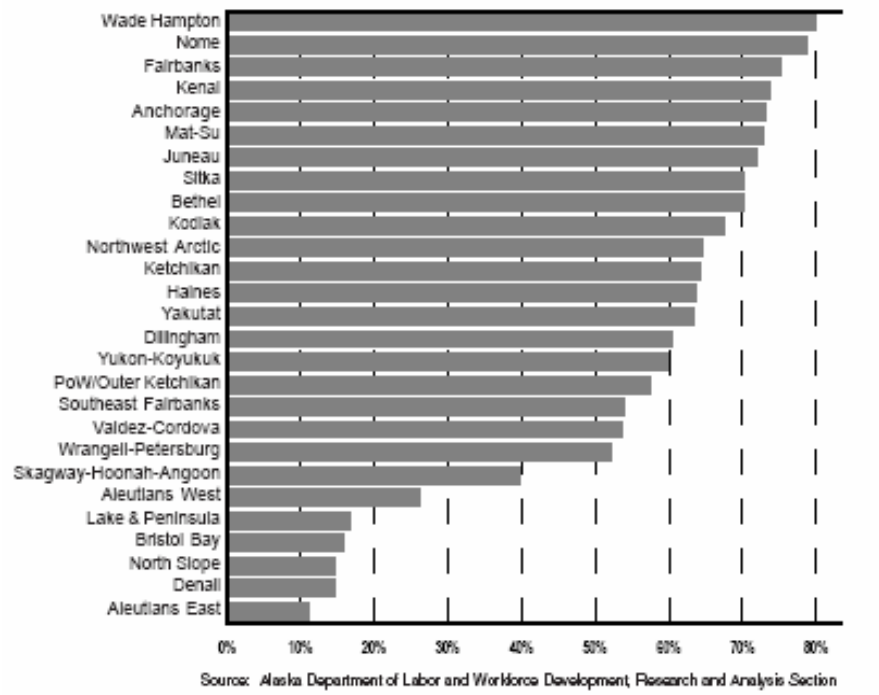
completed high school or less. The difference may be exaggerated by the out-migration of more highly educated, and therefore, employable residents.

Per capita income in the planning area ranges from above the Alaska average in Nome and Kotzebue, to under $8,000 per year in smaller villages (see Figure 3-8 on page 3-262, and Table 3-46 on page 3-269 in the Environmental Justice section). Per capita income reflects the relatively lower age of the planning area population. Only in the regional centers does per capita income begin to respond to the high cost of living.

The extent of individuals considered at or below poverty level has improved since 1990. Poverty level and change for the three boroughs has been reported by the Alaska Department of Commerce. In the Northwest Arctic Borough 17.4 percent of individuals were below poverty level in 2000, whereas 18.4 percent were below the level in 1990. In the Nome Census Area 17.4 percent of individuals were below poverty level in 2000, whereas 22 percent were below the level in 1990. In the North Slope Borough, 9.1 percent of the population was below poverty level in 2000, whereas 8.6 percent were below the level in 1990. In comparison, 9.4 percent of individuals in Alaska were below the poverty level in 2000.

There is definite income outflow evident in the Northwest Arctic Borough, which experienced an increase from 5.5 percent in the 1980s to 24.5 percent in 2000. The Nome Census Area has experienced little outflow and little change as income outflow has dropped from 3.5 percent to 2.6 percent (Sonoran Institute 2005).

**Figure 3-9. Percent of Private Sector Workers Who Are Local Residents**




Source: Hadland et al. 2005.

### *(5) Revenue*

Local government revenue in the planning area is influenced by exemption of ANCSA village corporations and regional corporations from certain forms of property taxation.

Villages and boroughs are empowered to levy and collect tax revenues if they are incorporated political subdivisions. Several villages or towns in the planning area levy sales taxes and specific use or product taxes. The North Slope Borough and city of Nome collect property tax, and the Northwest Arctic Borough collects a payment in lieu of property tax by agreement with Teck Cominco Alaska and the NANA Regional Corporation.

Table 3-45 on page 3-267 lists collections by those villages and boroughs that levy taxes. The columns labeled “Other Tax” aggregate collections for items such as liquor, tobacco, bed use, and fish. The North Slope Borough collections and revenue are greatly enhanced by North Slope oil field property taxes. This greatly skews the per capita revenues compared with the rest of the state. Point Hope and Point Lay are the only villages in the planning area that are within the North Slope Borough, and they collect no taxes. Anchorage, Fairbanks North Star Borough, Matanuska-Susitna Borough, and the city of Fairbanks are included in the table for comparison purposes.

**Table 3-45. 2004 Per Capita Tax Revenues in Dollars**

| Municipality* | Property Tax (Inc. Oil & Gas) | Sales Tax | Other Taxes | Total Taxes Reported | Population | Per Capita Revenue |
|---|---|---|---|---|---|---|
| Northwest Arctic Borough | 4,900,000*** | N/A | N/A | N/A | N/A | N/A |
| North Slope Borough | 199,804,529 | N/A | N/A | 199,804,529 | 7,228 | 27,643 |
| Anchorage | 322,352,907 | N/A | 19,681,861 | 342,034,768 | 273,565 | 1,250 |
| Fairbanks North Star Borough | 71,382,439 | N/A | 1,375,192 | 72,757,631 | 82,131 | 886 |
| Matanuska-Susitna Borough | 55,571,134 | N/A | 716,992 | 56,288,126 | 67,526 | 834 |
| Fairbanks, City** | 8,685,154 | N/A | 3,748,522 | 12,433,676 | 29,002 | 429 |
| Kotzebue | 0 | 2,423,193 | 61,754 | 2,484,947 | 3,070 | 809 |
| Nome | 2,410,511 | 3,484,362 | 94,741 | 5,989,614 | 3,414 | 1,754 |
| Noorvik | 0 | 109,032 | N/A | 109,032 | 648 | 168 |
| Deering | 0 | 19,120 | N/A | 19,120 | 131 | 146 |
| Koyuk | 0 | 34,788 | N/A | 34,788 | 341 | 102 |
| Brevig Mission | 0 | 29,781 | N/A | 29,781 | 313 | 95 |
| Elim | 0 | 29,031 | N/A | 29,031 | 342 | 85 |
| Selawik | 0 | 63,565 | N/A | 63,565 | 820 | 78 |
| Ambler | 0 | 22,470 | N/A | 22,470 | 291 | 77 |
| Teller | 0 | 15,098 | N/A | 15,098 | 242 | 62 |
| Kiana | 0 | 24,937 | N/A | 24,937 | 408 | 61 |
| Shishmaref | 0 | 34,129 | N/A | 34,129 | 594 | 57 |
| Buckland | 0 | 20,602 | N/A | 20,602 | 409 | 50 |
| White Mountain | 0 | 10,472 | N/A | 10,472 | 214 | 49 |
| Average statewide per capita revenue (excluding the North Slope Borough) | | | | | | 1,224 |
| Average statewide per capita revenue (including North Slope Borough) | | | | | | 1,518 |

Source: ADCCED 2005.
* Only those municipalities that levy a sales, severance, property, or other type of local tax are included in this table.
** Both the city of Fairbanks and the borough in which it is located levy taxes.
*** Figure represents Payment in Lieu of Taxes (Schaffer 2005).

## b) Environmental Justice

Iñupiat and Yup'ik Natives are the predominant minority population of the planning area. Demographic characteristics for communities within the planning area are presented in Table 3-46 on page 3-269. Data shows that all villages and towns have very high minority populations, all in excess of 50 percent. These same locales have high percentages of individuals and households with incomes below poverty level, although there is wide variability between villages. The work force participation percentage for all communities in this area is consistently lower than the participation rate for the state as a whole.

Environmental Justice is an initiative that culminated with President Clinton's February 11, 1994, EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," and an accompanying Presidential memorandum. The EO requires that each Federal agency consider environmental justice to be part of its mission. Its intent is to promote fair treatment of people of all races, so no person or group of people bears a disproportionate share of the negative environmental effects from the country's domestic and foreign programs. While the EO focuses on minority and low-income populations, the EPA defines environmental justice as the "equal treatment of all individuals, groups or communities regardless of race, ethnicity, or economic status from environmental hazards" (Envirosense 1997, U.S. Department of Energy 1997). Specific to the EIS process, the EO requires that proposed projects be evaluated for "disproportionately high adverse human health and environmental effects on minority populations and low income populations."

Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," requires the BLM to consult with Athabaskan and other tribal governments of the planning area on Federal matters that significantly or uniquely affect their communities. The EPA's Environmental Justice guidance of July 1999 stresses the importance of government-to-government consultation. As one way to foster tribal participation, the BLM held scoping meetings in seven villages in the planning area.

Scoping meetings and alternative development meetings were held during development of the draft plan and draft EIS. Nine scoping meetings were held during January through April 2004 at communities in the planning area, and Fairbanks and Anchorage. During this scoping process, the BLM received feedback on potential Environmental Justice concerns of the local residents**.**

Major concerns expressed at these meetings included:

- The Native community wants continued access and opportunity for subsistence hunting, but is concerned about impacts to subsistence activities, mostly related to increased recreational or sport hunting and fishing activities.
- Management of the WACH's important habitats and migration routes.
- A more detailed discussion of public concerns is provided in the Kobuk-Seward Peninsula Resource Management Plan Scoping Report (August 24, 2004).
- Subsistence activity is an important source of food and material which offsets high cost of living and high unemployment.

**Table 3-46. Environmental Justice Data from the 2000 Census**

| State or City | Per Capita Income | Percent of Population as a Minority* | Percent of Individuals Below Poverty Level Income** | Percent of Households Below Poverty Level Income** | Percent of Unemployed Population Over 16 Years of Age | Percent Population Over 16 Years of Age Not In The Labor Force |
|---|---|---|---|---|---|---|
| Alaska | $22,660 | 19.0 | 9.4 | 6.7 | 6.1 | 28.7 |
| Ambler | $13,712 | 84.8 | 14.3 | 19.0 | 20.6 | 26.6 |
| Brevig Mission | $7,278 | 90.6 | 48.4 | 43.3 | 1.3 | 46.4 |
| Buckland | $9,624 | 95.8 | 11.9 | 7.9 | 21.8 | 35.5 |
| Deering | $11,000 | 93.4 | 5.8 | 0 | 9.9 | 41.8 |
| Elim | $10,300 | 92.7 | 7.9 | 8.0 | 14.4 | 44.6 |
| Golovin | $13,281 | 84.0 | 4.3 | 0 | 2.4 | 32.1 |
| Kiana | $11,534 | 92.5 | 11.2 | 5.6 | 6.4 | 44.8 |
| Kivalina | $8,360 | 96.6 | 26.4 | 25.4 | 11.9 | 53.2 |
| Kobuk | $9,845 | 93.6 | 28.6 | 32.0 | 0.0 | 44.6 |
| Kotzebue | $18,289 | 71.2 | 13.1 | 9.2 | 6.9 | 29.9 |
| Koyuk | $8,736 | 91.9 | 28.0 | 29.3 | 20.0 | 42.2 |
| Noatak | $9,659 | 93.7 | 22.0 | 25.0 | 14.0 | 45.0 |
| Nome | $23,402 | 51.0 | 6.3 | 5.4 | 7.4 | 32.0 |
| Noorvik | $12,020 | 90.1 | 7.6 | 9.4 | 10.1 | 48.2 |
| Point Hope | $16,641 | 87.1 | 14.8 | 13.9 | 16.6 | 34.7 |
| Point Lay | $18,003 | 82.6 | 7.4 | 11.4 | 2.9 | 27.5 |
| Selawik | $8,170 | 94.8 | 34.4 | 34.6 | 15.2 | 55.6 |
| Shaktoolik | $10,491 | 94.3 | 6.1 | 0 | 16.6 | 40.1 |
| Shishmaref | $10,487 | 93.2 | 16.3 | 16.2 | 9.5 | 42.3 |
| Shungnak | $10,377 | 94.5 | 35.8 | 21.7 | 16.0 | 33.9 |
| Teller | $8,618 | 92.5 | 37.7 | 33.9 | 6.1 | 58.3 |
| Wales | $14,877 | 83.6 | 18.3 | 17.2 | 13.3 | 29.5 |
| White Mountain | $10,034 | 83.7 | 22.4 | 16.3 | 7.0 | 62.8 |

* Native Alaskan/Native American is the dominant minority.
** The poverty level is $8,794 for individuals and a family of four is listed at $17,603 nationally (2000).
Sources: http://www.census.gov/hhes/www/poverty.html and U.S. Census Bureau, Census 2000.

# c) Socio-cultural Systems

Unlike the socio-economic section, in which the current demographics of the region are discussed in terms of economics (e.g., population, employment, per capita income), this section focuses on the cultural differences that exist in the planning area. A socio-cultural system is a complex cultural structure consisting of a definable population within a determinable territory, characterized by shared and interrelated ways of life including beliefs, norms, values, and technologies, which are shared within the population and passed on from generation to generation. This system comprises the fundamental traditions, ideas, behavioral patterns, and tools that humans use to adapt to their surroundings, and forms the basis of each unique way of life and culture.

The planning area is the traditional home of the Iñupiat Eskimo, an indigenous people who have lived in the area for at least the past 2,000 years (Anderson 1984). Today, the Iñupiaq culture continues to flourish and succeed, despite over a hundred years of pressure in the form of continuous contact with mainstream American culture. The following sections describe the historical sociocultural circumstances of the Iñupiat before contact, an overview of the primary motivators of change that has occurred since contact, and a description of the sociocultural context as it exists today.

## *(1) Culture History: Traditional Social and Political Organization*

In the past, the entire planning area was populated by several[4] autonomous groups, each of which occupied a specific region that included at least one permanent winter village. These autonomous groups have been variously called regional groups, tribes, societies, and nations in the anthropological literature (Burch 1975, 1980, 1998; Ray 1984). Burch (1998) however, provides the most compelling rationale in referring to these prehistoric populations as nations, in that they 1) had dominion over separate territories, 2) regarded themselves as separate peoples, and 3) engaged each other in war and trade, all aspects that define them as analogous to modern nations.

Each Iñupiaq nation had its own unique designation, with most consisting of a territorial or place name designation coupled with the suffix -miut, meaning “people of.” For example, the Iñupiat who live in the Shishmaref area are also known as Tapqaamiut and Qigiqtaamiut, both ethnonyms that refer to place names affiliated with the area, Tapqaq being the entire northwestern coast of the Seward Peninsula, and Qigiqtaq referring to the village of Shishmaref itself (Koutsky 1981, Simon 1998). Many communities located in the planning area have an Iñupiaq name in addition to the common name found on maps, and most of the current villages can be directly correlated to a historic Iñupiaq nation.

Most of the historic Iñupiaq Nations had a similar settlement pattern, consisting of several communities that were populated in either the spring for a duration until summer, or in the late fall for a duration through the winter, and were located in the same general area from year to year (Burch 1998, Ray 1964). Most of these settlements were small, consisting of only two to five houses, but each nation also had a few regional settlements that were more densely populated and served as the primary destination for such events as Trade Fairs, Messenger

[4]The number of autonomous groups varies according to different authors. See Ray 1967, 1975, 1984; Burch 1990, 1998; and Simon 1998.

Feasts, or other festivals and holidays. During those times when the spring or winter settlements were not occupied, most residents traveled with their families to locations of abundant resources (which frequently changed from year to year), where they camped in temporary shelters.

The total number of the more or less permanent settlements varied by nation, as populations aged, merged, or split. Burch (1998) estimates that some nations, such as the Akuniġmiut who occupied the central Kobuk River area, had as few as eight permanent settlements, while others nations had as many as 20. Because of the ability to harvest and store an abundance of food, the few Iñupiaq Nations of the planning area who participated in whaling were able to concentrate themselves into a single settlement for at least part of the year (Burch 1990, 1998). Like settlements, pre-contact population estimates varied by nation, with the lowest being 264 and the highest 792. A total pre-contact population estimate for the entire planning area ranges betweens 6,700 and 8,200 residents (Burch 1998, Ray 1964).

Politically speaking, the Iñupiaq Nations did not have a formal government, characterized by a "chief" or other political position that had the responsibility for making decisions for the entire population. Instead, the basic socio-political unit of the group was the household, with household being defined as all of the people living together under one roof, and frequently consisted of extended families containing three or more generations. Ellanna (1983) describes the social organization of the Bering Strait region, stating that the domestic family unit or household traditionally contained membership beyond that of the nuclear family, including multiple wives, grandparents, and married siblings and their families. Kinship categories included those related by blood, by marriage, by adoption, and other socially defined categories that extend through generations. Kin relationships were and are considered very important, and, in the past, people without kinsmen were frequently perceived as dangerous or as a stranger (Bogojavlensky 1969, Ellanna 1983). Ultimately, kinship was the means by which the rules of interpersonal behavior, such as alliances, obligations, and responsibilities, were defined.

The other primary socio-political unit of importance was the qargi (also referred to as karigi, kashim, kashigi, and kazgi), or communal men's house (Burch 1990, 1998; Ellanna 1983; Ray 1964). The qargi was a large, centrally located gathering place, similar to a community hall, and the presence of a qargi defined whether a settlement was permanent (used repeatedly from year to year). During the day, men would use the qargi for a variety of activities, including carving, relating hunting tales, or educating young men. The qargi was also considered a forum for economic alliances, as it was where many community-wide ceremonies or feasts with neighboring groups took place. Politics, both within and outside the community, were discussed and decided upon in the qargi. Affiliation to a qargi was closely associated with kinship, hunting partnerships (such as skinboat crew participation in whaling communities), and other important political alliances, such as trade partnerships or war parties (Ellanna 1983).

### *(2) Major Historical Changes in Northwest Alaska in the 20th Century*

Changes that took place in the Kobuk-Seward Peninsula Planning Area during the 20th Century can be broken down into three separate but related categories: Economy, Social Life, and Politics. It is safe to say that every major change experienced by the nations of the region is a direct result of foreign, primarily Euroamerican, contact.

By the late 19th century, commercial whaling was the economic activity of most importance in the far north, especially along the northwest and northern coast of Alaska. Whale oil was sought for the tanning of leather, as lamp oil and lubricant, and baleen, or “whalebone” was used to make corset stays and buttons (Chance 1990). Trade with the Iñupiat primarily occurred by independent traders who followed the whalers to provide them with goods and services. This trade included ammunition, flour, black tobacco, matches, lead, and molasses for whalebone (baleen), caribou meat, and fur clothing. Although outlawed by the American government, whiskey was also a popular trade item. At the main whaling stations of Point Hope and Point Barrow, whaling was such a profitable enterprise that many Alaska Natives worked for white crews, or began commercial crews of their own. In 1908, it was reported that in Barrow several Iñupiat crews were able to pay their men wages equal to those of the white crews, basically $200 for the six-week season (Chance 1990). Whaling continued after the turn of the century, but by 1908 the decimation of whale stocks, the advent of synthetic whalebone and the rise of the petroleum industry all resulted in the end of whaling as a commercial enterprise.

Chance (1990) describes the impact of whaling and trade from 1848 to the turn of the century as dramatically changing the Iñupiat economic and social life:

“With newly obtained repeating rifles, Iñupiat and whites together had so reduced the number of sea and land mammals that the old subsistence economy was severely jeopardized. The introduction of whiskey as a trade item disrupted and demoralized village life. The spread of new diseases such as measles, smallpox, and influenza, to which the Iñupiat had no immunity, took a devastating toll.”

The presence of trading posts and access to white commodities, in addition to missionization, resulted in a slow change from a nomadic existence to a more sedentary one.

Missionization began in Northern Alaska in 1890, and by 1910 nearly every Alaska Native was Christian (Burch 1994). Many of the Alaska Natives in Southwestern Alaska had been converted by the Russians and practiced Russian Orthodox. However, when Alaska was transferred to American control a new wave of missionaries entered the last frontier to spread their version of Christianity. The Reverend Sheldon Jackson was appointed General Agent of Education for Alaska in 1885. Jackson established missions of various denominations at Barrow, Point Hope, Wales, and Unalakleet by the fall of 1890, each of which included a school, a nursing station, and a church.

In 1896, missionaries Johnson and Uyaraq visited a massive trade fair in the Kotzebue area that had brought together over 1,000 Iñupiat from the surrounding area for several weeks (Burch 1994, 1998). The impression made by the two missionaries was such that when Sheldon Jackson passed through on his inspection of the school the Alaska Natives asked him to establish a mission in the area, which he did in 1897. The missionaries at Kotzebue preached against the use of alcohol and tobacco, challenged the Native shamans, persuaded people to abandon ancient burial customs, promoted Christian marriage and attacked polygyny, and ordered a halt to Native dancing (Flanders 1991).

Missionization is acknowledged as the most influential historical change for the Iñupiat, due to the active agenda of westernization. Charles Brower et al. (1994) assert that the missionaries at Barrow were the primary driver of culture change for the Iñupiat by making the people of Barrow move out of their comfortable semi-subterranean homes and into drafty frame houses, keeping the residents in the village year-round so that their children went to school, and disallowing the practice of shamanism. However, in Northwest Alaska, a case has been made

that the role of the *anatguk*, or shaman, has simply been transformed, and is still found in Iñupiat communities today (Ganley 1996).

Another important contribution to the change in traditional Iñupiat lifestyle was the introduction of reindeer during the 1890s. Sheldon Jackson saw reindeer as being the solution to providing the Iñupiat with a large, permanent wealth-producing industry while at the same time addressing the problem of the decline in subsistence resources in the north (Chance 1990, Koskey 2003, Simon 1998). Approved by the American government, over the next ten years herds were imported, and Chuckchi, Lapp, and Saami herders were brought over to teach the Alaskans the reindeer trade. Herds were supervised by the missions, and later by the schools. A man began as an apprentice and was loaned a small herd, which he paid back as the herd multiplied.

Between 1892 and 1902, 1,250 reindeer were imported to Alaska from Siberia, and by 1932 they had increased to over 600,000 (Chance 1990). Over the next two decades, the amount of reindeer declined to such an extent that by 1940 only 200,000 remained, and by 1950 the number was reduced to 25,000. There are several reasons for this decline, including disease and predation, changes in government administration and policies, new opportunities for the Iñupiat to gain a cash income, and changing attitudes of the Iñupiat to subsistence hunting and wage labor. Today, reindeer herding still occurs in a limited area on the Seward Peninsula (see Livestock Grazing section beginning on page 3-143).

Trapping, especially for fox fur, became an important enterprise for the Iñupiat during the 1920s. Pelts often sold for between 50 and 100 dollars, and people needed money to buy what were now considered essentials: flour, tea, cloth tents, iron tools, and tobacco. The new commitment to trapping also brought about a number of changes to the social life of the Iñupiat, due to the replacement of traditional hunting patterns based on strong cooperative ties linking several related hunting partner families, with a trapping pattern characterized by a more individualistic enterprise, involving, at most, two families (Chance 1990).

With missionization, and more importantly, with the coming of whalers, prospectors, and trappers, came disease. In 1900, more than 200 inland Eskimos died of influenza after trading in Barrow, due to the visit of a whaling ship. Not two years later at least 100 Barrow people died of a measles epidemic (Chance 1990). In Wales in 1918, over two-thirds of the population died in one week after an Iñupiaq man with influenza arrived in town, and in Teller over 197 adults died from the same illness. So much death, especially of adults, led to a more rapid decline of doing things in the traditional way.

During the 1930s, a number of new social policies established by the United States Government continued the conversion of the Iñupiat to a more cash based lifestyle. These included old-age pensions, Aid for Dependent children allotments, and other relief funds. The establishment of Post Offices in every community with a school provided jobs in the form of postmasters, secretaries, and janitors (Hughes 1965). In the 1940s numerous Alaska Natives joined the military, both as defenders of the country in the Army or Navy, and as defenders of the state in the Alaska National Guard.

After the war a number of new economic opportunities appeared. Oil exploration on the North Slope brought with it a number of jobs, as did the installation of numerous military bases and communication outposts. Chance (1990) describes numerous features of change in the social life of the Iñupiat due to the change toward reliance on cash. Small things like a switch to bottle feeding of infants, and the wearing of diapers occurred. Larger changes, such as the undermining of women's autonomy due to the incorporation of the western view of womenhood,

the distancing of teenagers from their parents due to the adoption of popular American culture, and changes in marriage and courtship due to the new economic environment occurred (Chance 1990). Similarly, the problems of alcoholism and drug abuse, the high rates of suicide in the villages, and death due to heart attacks, as a result of high cholesterol with the substitution of American foods such as Crisco for seal oil, are all a direct result of acculturation.

The mid-to-latter half of the 20th century has been extremely important in the history of Northwest Alaska and Alaska in general. In 1931 the BIA was established, which provided Alaska Natives with a variety of human services and programs, from health care to education and welfare payments. In 1934, the establishment of the Indian Reorganization Act, and its amendment in 1936, gave Alaskan Native communities the right to organize their tribal governments under Federal constitutions and to establish Federally chartered businesses and cooperatives (Case 1984). This meant that Alaska Natives have had to become extremely familiar with American government and political procedure, in order to be successful. In 1958, the Statehood Act added to the levels of government regulating small communities, but also allowed for the creation of municipalities at the local and regional level.

ANCSA permitted the conveyance of some 44 million acres of land to Alaska Native corporations along with a cash payment of over $1 billion, in exchange for the alleged extinguishment of aboriginal Native claims in Alaska. The Alaska Native Allotment Act (actually established in 1906) and ANILCA, passed in 1980, gave individuals and family groups the right to land, although not specifically ownership per se (Case 1984).

### *(3) Local and Regional Sociopolitical Organization Today*

For the Iñupiat, kinship networks and the role of the family are just as important today as they were before contact. Although living in nuclear family units comprised of parents and children is more customary than the extended family households of the past, relatives are still the fundamental pool from which partnerships, support, and aid are sought, and to which obligations are due. Kin networks continue to be the basis of alliance and affiliation in modern Iñupiaq culture.

All of the communities in the planning area have a two-branch political system, the local municipal government of the city (or the “city office”), and the local tribal government, consisting of the Native village Tribal council (formerly the IRA Traditional Council). For example, the two local government offices in Shungnak include the city of Shungnak and the Native Village of Shungnak, each with their own responsibilities for the community. Municipal services, such as water and sewer, electrical and power, public safety, and cable TV, are handled by the City Office. Social services such as child care, language revitalization programs, or Elder Councils, including any issue that has the potential to affect the tribe or the Iñupiaq culture, are handled by the Native village. These include issues about land, hunting, subsistence, livelihood, local research (biological and social), and other important social concerns like local hire, substance abuse, and the importance of maintaining traditional Iñupiat values.

The passage of ANCSA resolved land claims between the indigenous Alaska Natives, the State, and the Federal government. Under ANCSA, Alaska was divided into 12 regions, with each region having a for-profit corporation responsible for managing the land entitlement and money derived from ANCSA. A thirteenth corporation was also created for those Alaska Natives living outside of the state. Three regional corporations are present in the planning area: the Bering Straits Regional Corporation based in Nome, the NANA Regional Corporation based in Kotzebue, and the Arctic Slope Regional Corporation based in Barrow. The regional

corporations in Alaska today are some of the most successful businesses in the state, holding diverse investment portfolios including properties such as hotels or apartment complexes, industries such as oil and gas or construction, and stocks or other capital investment.

Most of the communities in the planning area also have a local for-profit village corporation. Village corporations are responsible for managing the land and money each individual community received with the passing of ANCSA, and are also able to bid on contracts, create investments, and engage in other for-profit activities for their shareholders. Every Iñupiaq resident living in the planning area in 1971 qualified for 100 shares each of their regional and local village corporation. Every year in which a profit is made, local and regional corporations distribute dividends to their shareholders, similar to the traditional system of reciprocity in which resources are shared within regions and communities.

The three regional corporations of the planning area also have an associated non-profit social services entity: Kawerak on the Seward Peninsula, the Maniilaq Association in the Kotzebue area, and the Arctic Slope Native Association in Barrow. The non-profit organizations primarily provide health, social, and tribal services to the resident communities of the region, including educational and cultural preservation opportunities for regional shareholders. It should be noted that the regional corporations, village corporations, and regional non-profits are all “owned” by the indigenous population of each region, not the populations at large.

Additional Alaska Native non-profit organizations which serve to represent a variety of indigenous issues are also located in the three regional centers of Barrow, Kotzebue, and Nome. Examples of these include the Bering Straits Foundation, dedicated to the preservation and protection of the cultural heritage of the region, including cultural sites and property management; and the Alaska Eskimo Whaling Commission, formed in 1977 to represent the whaling communities, and protect and preserve the subsistence hunt of bowhead whales. Additional non-profit entities that are subsumed within the overarching regional nonprofits, such as the Eskimo Walrus Commission or the Reindeer Herders Association, serve specific roles relative to maintaining the traditional way of life of Alaska Native residents in the planning area.

Two additional regional governments are also present in the planning area, the Northwest Arctic Borough, with its main offices in Kotzebue, and the North Slope Borough, with its main offices in Barrow. The Northwest Arctic Borough was formed in June 1986, is a home rule borough and the local political subdivision of the State. The borough is comprised of 11 communities in northwest Alaska, has an 11 member assembly, a 7 member planning commission, and a 15 member staff. Borough formation has allowed these 11 communities to work cooperatively to receive state funds for transportation infrastructure, telecommunications systems, and other services for the benefit of the people of the region. The North Slope Borough was formed in 1972, and is the largest home rule borough in the country, comprising 86,000 square miles. The borough consists of eight communities located north of the Brooks Range, two of which (Point Hope and Point Lay) are located in the planning area. Though officially members of the North Slope Borough, many municipal services such as health care that are provided to Point Lay and Point Hope originate from the Northwest Arctic Borough given the proximity of these communities to Kotzebue.

# F. Subsistence

Subsistence in Alaska is the traditional way of life of Alaska Natives, and, under the terms of the Federal subsistence provisions in ANILCA, for other rural Alaskans as well. While many hold the view that subsistence is simply the taking of fish and game resources for nutrition, in actuality it is about the harvest, processing, distribution, and consumption in a traditional way that can not be separated from other aspects of the Alaska Native culture. Subsistence is the connection that the Iñupiat have with the land, weather, and resources of the planning area, and, as such, it comprises the core of Iñupiat culture as much today as it did in the past.

State and Federal law define subsistence as the “customary and traditional uses” of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade. Subsistence uses are central to the customs and traditions of the indigenous cultural groups in Alaska, including the Iñupiat. Subsistence hunting and fishing are important sources of employment and nutrition in almost all rural communities, and the opportunity to engage in a subsistence lifestyle is guaranteed for rural residents by ANILCA.

## *1. Traditional Subsistence Use Patterns in the Planning Area*

The majority of the resources exploited in the planning area are seasonal, which means that there are periods of scarcity and abundance during the yearly cycle. To take full advantage of the resources of the area, settlements were moved with the seasons. For example, in the Shishmaref area, the people followed a sedentary seasonal subsistence pattern, distinguished by a cycle of economic pursuits and movements within a specific geographic region. “Each year at freeze-up, members returned from small, scattered settlements to a central base, or home village, usually located on the coast. The people remained at their home villages through the winter, engaged in subsistence activities. In the spring they relocated to inland areas and moved up rivers and streams to pursue the seasonal resource” (Koutsky 1981).

Three traditional subsistence patterns have been defined by Ray (1983) for the Bering Strait Region of Alaska. The first is designated the Whaling Pattern and consists of whale, walrus, and seal hunting and fishing. The second is the Caribou Hunting Pattern and included caribou hunting, fishing, and some small marine-mammal hunting of seal and beluga. The third is the Small Sea Mammal Pattern consisting of the harvest of seal, beluga, fish, and caribou. These subsistence patterns have three important aspects: 1) the seasonal mobility of the inhabitants for food gathering purposes, 2) the flexibility of the food quests and the variety of principle foods utilized in one subsistence area, and 3) the many alternatives offered in all subsistence patterns, especially the Small Sea Mammal and the Caribou Patterns (products not available within the patterns were usually obtainable through trade) (Ray 1983).

On the Seward Peninsula, most of the communities conformed to Ray’s *Small Sea Mammal* Pattern. A seasonal year for most Seward Peninsula pre-contact nations, began in the winter with people returning to their home village which was usually located in an area with good winter resources. At this time, people went seal hunting on the ice, fishing for tomcod, flounder, and bullheads, and snared small mammals and ptarmigan. A successful early winter hunt, supplemented by food in storage, allowed long trips for visits with relatives in other villages and for seasonal festivities.

Ugruk, or bearded seal, hunting occurred in the early spring. When the ice began to break up, people traveled to their ugruk hunting camps on the coast, and if they were lucky, they also harvested walrus and beluga whales. Ground squirrels and hares were also snared at this time.

During the summer, most people moved to fishing camps located along the rivers, when they gathered and processed fish, greens, migrating waterfowl, and eggs. Small animals were also snared, and berries were picked when they became ripe. In the fall cooperative hunts were organized to take advantage of the migrating caribou herds that passed through the area.

The only community on the Seward Peninsula to participate in whaling (conforming partially to Ray's *Whaling Pattern*) is Wales, a result of its close proximity to the migration route of bowhead whales through Bering Strait. Whaling occurred primarily in spring, and required a well-organized cooperative effort on a yearly basis.

In the Kotzebue-Northwest Area, defined by most researchers as the area north of Seward Peninsula, most communities either conform to Ray's *Small Sea Mammal Pattern* or the *Caribou Hunting Pattern,* depending for the most part on a community's proximity to the ever-changing migration routes of the WACH. As was mentioned above, the flexibility inherent in any subsistence strategy that follows the seasonal availability of a variety of resources results in the adaptability of a community to focus on those resources that are the most abundant in any given time or place.

The generic traditional seasonal round for the Kotzebue Sound-Northwest Area is described as follows. During breakup, most people occupied small settlements on the outer coast. As breakup proceeded men hunted ringed and bearded seals, first individually in kayaks, and then in crews using umiaks as the large pans of ice began to separate. While the men were hunting, the women dried meat and skins, making sealskin rope and storing the dried meat and blubber in pokes. Food eaten during the spring consisted of fresh and just-dried seal meat, supplemented by eggs and waterfowl that were snared and shot in the lakes behind the beach. People who needed to put new covers on their boats did so during the spring.

When all of the ice was gone, people packed up their boats and headed south, joining other travelers in boats along the way, all of them heading for Sheshalik and the great trade fair (located to the north of Kotzebue, near the mouth of the Noatak River). Time was spent hunting ducks and geese, an occasional stray beluga, and fishing for salmon and whitefish.

In early August the trade fair was over, causing most of the foreigners to leave for home. The local residents at this time stayed where they were, spreading out along the northern shore of Kotzebue Sound and the western side of Kotzebue (Baldwin) Peninsula, and began harvesting salmon in earnest. Whitefish were caught as the salmon run ended. Women fished, dried fish, and picked greens, Eskimo potatoes (*Hedysarum alpinum*), and berries. Burch (1990) states that most of the men went caribou hunting, using both snares and bows and arrows, and also got a number of bears using spears. Hunters returned about the middle of September, at which time families returned to their fall winter settlements.

As the water began to freeze, attention focused on fishing for tomcod, Arctic cod, sculpin, and flounder using hooks in holes in the ice. Some people set nets made of willow bark in lagoons or lakes for whitefish. Others went out and began netting sheefish under the ice, but because of a taboo that didn't allow bringing these fish home until midwinter, they were usually left in a pile

in the ice until then. Other fall subsistence activities include hunting caribou, snaring ptarmigan, and setting traps for furbearing mammals.

During the winter, Kotzebue seems to have been better off than most of the other communities/villages south on the Seward Peninsula, and north up the coast. The reason given for this is the fact that fish could be harvested year round in the Kotzebue area (Burch 1990). Ptarmigan and caribou were still around, and seals could be caught off the northern shore of Kotzebue Sound. The months of November to January were considered the holiday season. Activities mostly included dances and feasts, with people moving back and forth from village to village.

The communities of Point Hope, Wales, and Kivalina are the three communities in the planning area that practiced Ray's *Whaling Pattern* in the past, and all three are considered active whaling communities today. Whaling is a communal effort, and it is customary for an entire village to participate in the process. In this way, whaling requires the role of a lead organizer, someone to ensure that labor is properly utilized and that prescriptions are followed to ensure a successful hunt. This role is filled by the *umialik*, or boat captain, who had the responsibility of providing all of the needed gear, materials, and supplies. The status of *umialik* is achieved through wealth or having access to the raw materials needed to construct a boat, lookout camp, and provide food for the crew, as well as through prestige, which is successful leadership denoted by making sure that the proper respect is shown to ensure a safe and successful hunt.

While whales provide a large amount of food that could be shared by an entire community and sustain them on a year-round basis, the act of whaling required supplies and equipment derived from a wide variety of resources including caribou skins for sleeping pads, small seal skin floats, antler for harpoon heads and foreshafts, and walrus or bearded seal skins for boat covers, to name just a few. As a result, while whaling allowed for a relatively more sedentary lifestyle where entire nations would come together twice in a year to harvest whales, whaling communities also practiced a seasonal round of harvesting, traveling to where the resources could be harvested or obtained through trade.

A typical year for whaling communities begins in the spring, when whaling crews and their wives would begin to go through the gear in order to see what needed to be replaced, mended, or created anew. As soon as leads, or areas of open water, began to appear in the ice, lookouts would be posted and camps would be established on the ice after the sighting of the first whale, usually in March or April. Spring whaling in the communities of the planning area would be over by the beginning of May, at which time hunters, still working as a crew as during whaling, would focus their efforts on walrus and bearded seals (Spencer 1959, 1984).

During summer, the whaling crews tended to break up, and travel inland in family units, to either hunt caribou or harvest fish, or both. Late summer was a time to come together at trading centers and exchanging needed commodities such as seal oil, caribou skins, and other resources not readily available. During the fall people returned to their established sedentary villages, and shore-based whaling occurred, especially if spring whaling was not that successful, and if the conditions were right (Foote 1960). Once winter set in, men would hunt small seals on the ice at their breathing holes, and fishing would occur through the ice in rivers or lakes near the village. Like the other subsistence patterns, winter was also a time of festivity and feasting, a time for communities to come together and celebrate the success of the past year, and ensure a continued bounty.

## 2. Subsistence Patterns Today

For the most part, the resources that were utilized by the residents of the planning area in the past are still utilized by the residents of today, albeit harvested with modern technology. The primary sea mammal resources of the planning area consist of bowhead whale, beluga, bearded seal, ringed seal, harbor seal, and walrus (Map 3-39, Map 3-42, and Map 3-45). Migratory waterfowl are still the primary fresh meat of the spring, and fishing occurs year-round. Caribou, and lately, moose and musk-oxen comprise the primary large land mammals actively hunted in the planning area. Additionally, small mammals such as ground squirrel, Arctic hare, snowshoe hare, and muskrat are used both for their meat or fur. Other animals presently harvested from the planning area include porcupine, martin, red fox, white fox, wolverine, weasel, mink, river otter, wolf, lynx, marmot, ground squirrel, hare, grizzly bear, polar bear, and mountain sheep (Map 3-37, Map 3-40, and Map 3-43).

According to Burch (1990, 1998), elders of the Kotzebue region consider fish to be the most important resource of the area, an assertion that is reflected in the large per capita harvest of this resource (see Table 3-47). Whitefish is located throughout the lagoon, and salmon runs occur on both the Noatak and Kobuk rivers. Char migrate through the Sound during the summer, heading for the Agashashok and Noatak rivers. Fresh water fish include blackfish, suckers, grayling, and pike, and ocean varieties include tomcod, blue cod, flounder, smelt, sculpin, capelin, and herring (Map 3-38, Map 3-41, and Map 3-44).

Although most residents of the planning area live a sedentary life in organized communities, hunters and fishers still travel great distances to subsist. The incorporation of new technologies such as snow mobiles, OHVs, and gas-powered boats allow hunters access to larger areas of land with less time and effort. In this way, it is possible to work within a wage-based economy, while still practicing a subsistence lifestyle. Likewise, it is still customary for most communities to relocate to seasonal camps for specific activities, such as the putting up of bearded seal meat or fish, even if these seasonal camps are only located a short distance from the permanent village. Additionally, as part of the land claims settlement of ANCSA, many of the residents of the planning areas have allotments, or small tracts of private land located in their traditional harvest areas within their region. Travel to, and extended stays at, family allotments is still a yearly occurrence throughout the planning area.

During the scoping process for the current plan, the BLM received numerous comments related to subsistence, specifically, that subsistence use of resources is the priority for all communities in the planning area, and that the protection of this use from other uses or from resource development is integral to the well-being of the Iñupiat who live within the planning area. One major concern that arose during scoping was the issue of competition between subsistence hunters and sport hunters. Some areas within the planning area, such as the Squirrel River corridor, have become especially attractive to sport hunters who fly in from cities that do not have a Federal rural subsistence priority such as Anchorage or Fairbanks. This increase in competition for resources has resulted in subsistence hunters being marginalized within the area.

Many comments received during scoping identified locally important subsistence use areas such as the headwaters of the Koyuk, Ungalik, and Inglutalik rivers; Nulato Hills; and Norton Bay. Norton Bay was also identified as an area that is important for subsistence on a statewide level. This area supports fish and wildlife resources that migrate to other areas of the state. Although the highest subsistence use areas were selected by the Native corporations to protect

those lands, all of the Federal lands outside of Native corporation boundaries in the Nulato Hills are also important for subsistence use.

Table 3-47 lists the most complete harvest information by community currently available for the planning area. It should be noted that for many of the communities, harvest information is lacking. It is important to note that this lack of data is not a reflection of the importance of subsistence resources to residents or communities. For many of the other communities, the numbers represented in the table from the mid-to-late 1980s still represent the most current numbers for the area. Data on subsistence harvest in the planning area is lacking simply because research in this area has been slower to become initiated, this region has experienced less pressure for industrial activity or other development, and there is less user-conflicts than areas located on or near the main road corridors.

**Table 3-47. Resources Harvested and Reported Per Year**

| Community | Pounds of Resources Harvested Per Capita | | | | |
|---|---|---|---|---|---|
| | Birds | Fish | Sea Mammals | Land Mammals | Vegetation |
| Ambler | 15.02 | ND | ND | ND | ND |
| Brevig Mission | 18.93 | 190.86 | 326.81 | 25.54 | 15.78 |
| Buckland | 15.28 | ND | ND | ND | ND |
| Deering | 23.61 | 33,681 | 221.10 | 189.46 | 9.44 |
| Elim | 10.71 | ND | ND | 123.24 | ND |
| Golovin | 24.61 | 242.87 | 191.35 | 105.48 | 29.47 |
| Kiana | 6.10 | ND | ND | 187.30 | ND |
| Kivalina | 10.79 | 253.29 | 318.02 | 165.25 | 14.03 |
| Kobuk | 19.8 | ND | ND | ND | ND |
| Kotzebue | 3.52 | 237.72 | 157.71 | 177.46 | 16.23 |
| Koyuk | 17.63 | ND | ND | 174.76 | ND |
| Noatak | 4.48 | 179.49 | 47.67 | 224.40 | 4.85 |
| Nome | 5.13 | ND | ND | ND | ND |
| Noorvik | 16.79 | ND | ND | ND | ND |
| Point Hope | ND | ND | ND | ND | ND |
| Point Lay | 48.40 | 24.74 | 637.41 | 177.71 | 1.85 |
| Selawik | 7.35 | ND | ND | 298.47 | ND |
| Shaktoolik | 16.91 | ND | ND | 144.36 | ND |
| Shishmaref | 27.64 | 157.53 | 441.45 | 150.38 | 12.86 |
| Shungnak | 10.5 | 369 | 1.5 | 249.2 | 10.2 |
| Teller | 6.54 | ND | ND | ND | ND |
| Wales | 11.62 | 98.72 | 580.33 | 25.53 | 4.69 |
| White Mountain | 32.53 | ND | ND | 102.53 | ND |

Source: Alaska Department of Fish and Game, Community Profile Database—most representative reporting year; Magdanz et al. 2004.
ND = no data

## 3. Federal Subsistence Management

Title VIII of ANILCA establishes both a conservation mandate (conserve healthy populations), and an allocation mandate (priority for non-wasteful subsistence uses by rural residents) for subsistence on public lands in Alaska. These mandates are implemented through the Federal Subsistence Program, which is comprised of the Federal Subsistence Board (FSB), 10 Regional Advisory Councils (RACs), and interagency staff specialists. The Federal Subsistence Program provides for the customary and traditional uses by rural Alaska residents of wild, renewable resources for:

- Direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation;
- The making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption; and
- Barter, sharing, and customary trade.

ANILCA Title VIII also ensures reasonable access by rural residents to subsistence resources on public lands, and mandates a priority for subsistence use over the taking of fish and wildlife for other purposes (such as commercial or recreational use).

The FSB consists of the Regional or State Directors for the FWS, BLM, USDA Forest Service, NPS, and BIA, and is chaired by a subsistence user representative appointed by the Secretary of the Interior. The FSB is tasked with management of subsistence resources on public lands relative to population health and maintenance, including setting bag limits, seasons of harvest, means of taking, regulatory and public processes, and providing a rural priority.

Under Alaska's Federal subsistence regulations, which only apply to Federal public land, a person must be a rural Alaskan resident to harvest fish and wildlife. All communities and areas within the planning area are designated as rural, therefore, all permanent full-time residents of the planning area are eligible subsistence harvesters. Under these regulations, seasonal residence does not constitutes a primary permanent residence, and is therefore not sufficient to qualify a person as a rural resident.

The FSB also determines which communities and areas have customarily and traditionally taken specific fish and wildlife populations. These customary and traditional use determinations are listed along with seasons and harvest limits for each management unit in the Federal regulations. If there is a positive determination for specific communities or areas, only those communities and areas have a Federal subsistence priority for that particular species in that management unit. If no customary or traditional use determination for wildlife/fish population in a management unit has been made by the FSB, then all rural residents of Alaska may harvest fish or wildlife from that population. The FSB may determine that there is no customary and traditional use of a specific fish or wildlife population. This means there is no Federal subsistence priority and, therefore, no Federal subsistence seasons or bag limits for that area and population.

The planning area has within its borders more than 20 Federal qualified subsistence communities, and encompasses wholly or in part three Game Management Units. Each management unit or subunit has multiple species, multiple populations, intense allocation claims by commercial, sport and subsistence user groups, intensive inter and intra community competition for subsistence resources, and multi-cultural user groups.

The BLM is responsible for administering the Federal Subsistence Program on BLM public lands in the planning area, including data collection and analysis, and implementing and enforcing regulations. The overall objective is to provide for rural subsistence use, while maintaining healthy populations of subsistence resources within the bounds of recognized fish and wildlife management principles.

DOI goals are found in *Department of Interior Strategic Plan 2003-2008*. No specific goals exist for subsistence; however, mention is made of the unique trust responsibility and relationship that exists between the DOI and the 562 Federally recognized American Indian and Alaska Native tribal governments. The strategic plan states that:

"Each possesses a right to tribal self determination and self-governance, in accord with their sovereign authority. The Department represents the Federal side of that relationship. Our responsibilities are to work with Tribal groups and governments to improve and protect their land and natural resource assets, manage Indian trust accounts, fulfill treaties and the mandates of Federal law, and help create educational opportunities and improve the quality of life (DOI 2003)."

BLM's national goals are outlined in the *Bureau of Land Management Strategic Plan 2000-2005* (BLM 2000) The mission goals related to subsistence are to preserve natural and cultural heritage resources, understand and plan for the condition and use of the public lands, and restore at-risk resources and maintain functioning systems.

# 4. Economics of Subsistence

In the previous section (Subsistence) we note the significance of the harvest of natural resources for personal use. In this section we examine the value of the harvest. Table 3-49 shows that where data is available, every community participates in all traditional subsistence harvest activities. This table displays the only relatively recent reliable data available on the subject. Data gaps appear, but where the data is complete, it is relatively consistent. Census data from 1990 is used, as the data is from various years, it is closest to the 1990 census. The value per pound of resource is taken as an average of $4.00 based upon valuations published by Colt (2004) and Wolfe (2000). It is important to note these valuations are not adjusted for local cost. The market basket cost of food in the planning area is much higher than urban communities in Alaska, and still higher than most communities in the United States. Table 3-48 shows the UAF Cooperation Extension Service market basket cost for a family of four (two children 6-11 years of age) for a week in December 2004.

**Table 3-48. Market Basket Comparison**

| Location | Nome | Anchorage | U.S. |
|---|---|---|---|
| Market basket cost | $233.19 | $107.37 | $98.70 |

Source: http://www.uaf.edu/coop-ext/index.htmlAlaska Food Cost Survey UAF Cooperative Extension Service, January, 2005 (http://www.uaf.edu/coop-ext/fcs/2004q4data.html)

The market basket is more than twice the cost of comparable goods in either location compared. UAF Cooperative Extension Service supplies data collected quarterly in 21 Alaskan communities. Nome is the only community in the planning area where market basket data is

collected. The significance is that the value of subsistence resources to villages in the planning area may be understated by the accepted valuation.

## Table 3-49. Subsistence Resource Harvest and Economic Significance

| Community | Population (1990) | Birds* | Fish* | Sea Mammals* | Land Mammals* | Vegetation* | Per Capita Use (pounds) | Value ($4/pound) |
|---|---|---|---|---|---|---|---|---|
| Ambler | 311 | 4,955 | ND*** | ND | ND | ND | NA** | NA |
| Brevig Mission | 198 | 3,473 | 35,016 | 59,958 | 4,685 | 2,895 | 536 | $2144 |
| Buckland | 318 | 5,787 | ND | ND | ND | ND | NA | NA |
| Deering | 157 | 3,481 | 33,681 | 32,603 | 27,937 | 1,392 | 634 | $2525 |
| Elim | 264 | 2,870 | ND | ND | 38,540 | ND | NA | NA |
| Golovin | 127 | 4,158 | 41,038 | 32,332 | 17,823 | 4,979 | 790 | $3160 |
| Kiana | 385 | 2,415 | ND | ND | 71,351 | ND | NA | NA |
| Kivalina | 317 | 3,708 | 87,068 | 109,339 | 56,803 | 4,823 | 810 | $3240 |
| Kobuk | 69 | 2,020 | ND | ND | ND | ND | NA | NA |
| Kotzebue | 2751 | 12,852 | 867,354 | 575,419 | 647,478 | 59,207 | 786 | $3144 |
| Koyuk | 231 | 4,969 | ND | ND | 48,402 | ND | NA | NA |
| Noatak | 333 | 1,698 | 68,068 | 18,078 | 85,099 | 1,838 | 525 | $2100 |
| Nome | 3500 | 18,014 | ND | ND | ND | ND | NA | NA |
| Noorvik | 531 | 10,400 | ND | ND | ND | ND | NA | NA |
| Point Hope | 639 | ND | ND | ND | ND | ND | NA | NA |
| Point Lay | 139 | 5,836 | 2,983 | 76,853 | 21,426 | 223 | 790 | $3160 |
| Selawik | 596 | 4,088 | ND | ND | 210,190 | ND | NA | NA |
| Shaktoolik | 178 | 3,692 | ND | ND | 33,923 | ND | NA | NA |
| Shishmaref | 456 | 15,481 | 88,216 | 247,212 | 84,215 | 7,204 | 956 | $3824 |
| Shungnak | 223 | 4,345 | ND | ND | 87,914 | ND | NA | NA |
| Teller | 151 | 1,964 | ND | ND | ND | ND | NA | NA |
| Wales | 161 | 1,770 | 15,043 | 88,431 | 3,890 | 714 | 610 | $2440 |
| White Mountain | 180 | 7,139 | ND | ND | 21,653 | ND | NA | NA |

*Pounds harvested per community.
**NA = not applicable due to inconsistent or absent data
***ND = No data available

Source: ADF&G Subsistence Division Community Profile Database
http://www.subsistence.adfg.state.ak.us/geninfo/publctns/cpdb.cfm

INSERT 8½x11 MAP
**3_37_sub_nw_mammals**

INSERT 8½x11 MAP
**3_38_sub_nw_fish**

INSERT 8½x11 MAP
**3_39_sub_nw_marine**

INSERT 8½x11 MAP
**3_40_sub_sew_mammal**

INSERT 8½x11 MAP
**3_41_sub_sew_fish**

INSERT 8½x11 MAP
**3_42_sub_sew_marine**

INSERT 8½x11 MAP
**3_43_sub_kobuk_mammal**

INSERT 8½x11 MAP
**3_44_sub_kobuk_fish**

INSERT 8½x11 MAP
**3_45_sub_kobuk_marine**